# United States Coast Pilot 6

## Great Lakes: Lakes Ontario, Erie, Huron, Michigan, and Superior and St. Lawrence River

2000 (30th) Edition

VK
983
.N37u
30th ed
2000

This edition has been corrected through: 9th Coast Guard District Local Notice to Mariners No. 33/99. Changes 1 through 11 to the previous edition (29th Edition, 1999) have been entered into this edition. Changes to this edition will be published in the Ninth Coast Guard District Local Notice to Mariners and the National Imagery and Mapping Agency (NIMA) Notice to Mariners. The changes are also available on the Internet at http://critcorr.ncd.noaa.gov/.

LIBRARY
N.O.A.A.
U.S. Dept. of Commerce

**U.S. DEPARTMENT OF COMMERCE**
William M. Daley, Secretary

**National Oceanic and Atmospheric Administration (NOAA)**
D. James Baker, Under Secretary of Commerce for Oceans and Atmosphere, and Administrator, NOAA

**National Ocean Service**
Nancy Foster, Assistant Administrator for Ocean Services and Coastal Zone Management

Washington, DC 2000
For sale by the National Ocean Service and its sales agents.

# National Oceanic and Atmospheric Administration

## Climate Database Modernization Program

### ERRATA NOTICE

One or more conditions of the original document may affect the quality of the image, such as:

Discolored pages
Faded or light ink
Binding intrudes into the text

This document has been imaged through the NOAA Climate Database Modernization Program. To view the original document, please contact the NOAA Central Library in Silver Spring, MD at (301) 713-2607 x124 or www.reference@nodc.noaa.gov.

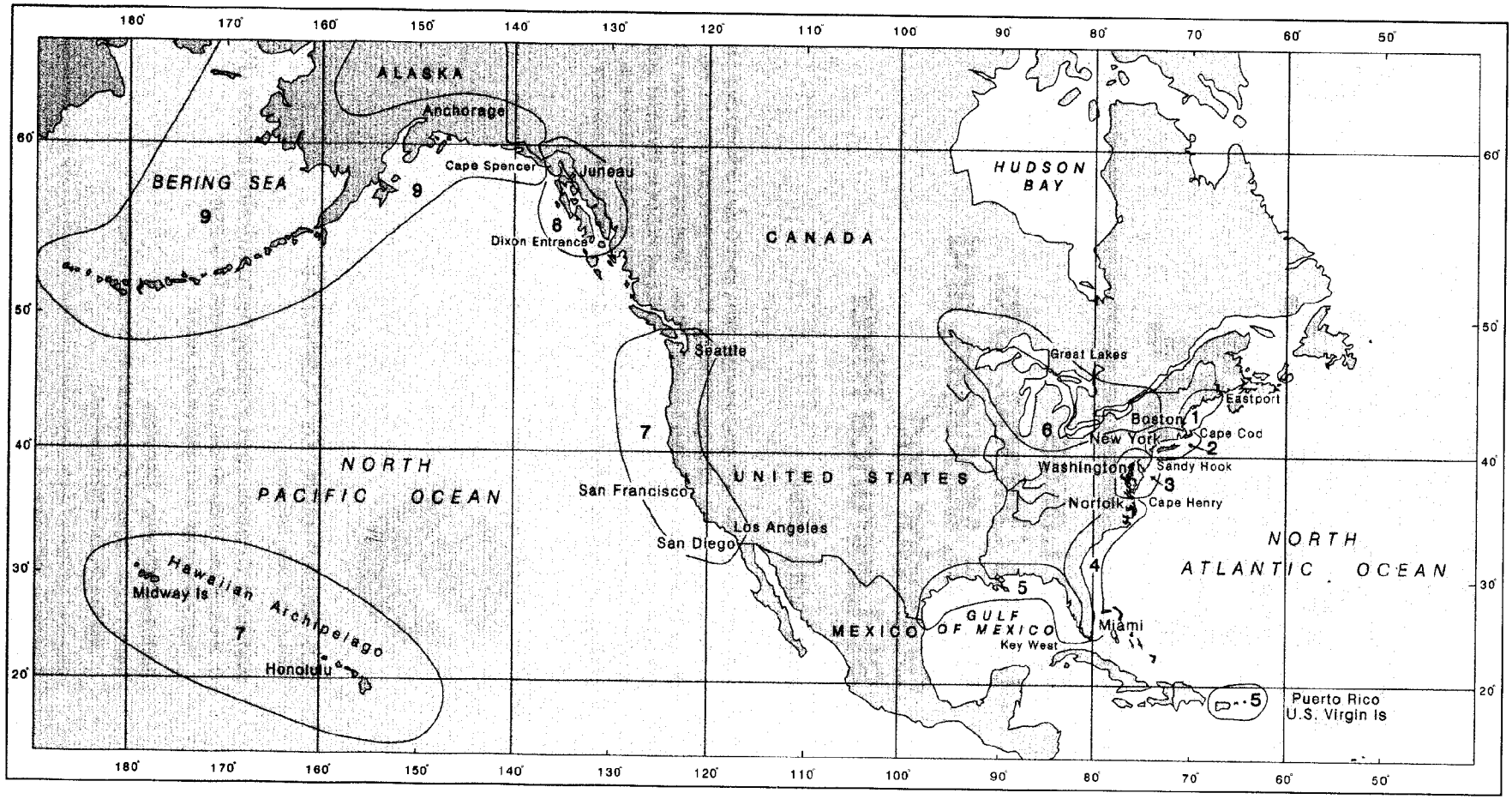
LASON
Imaging Subcontractor
12200 Kiln Court
Beltsville, MD 20704-1387
March 28, 2002

# LIMITS OF UNITED STATES COAST PILOT

Atlantic Coast
- 1 Eastport to Cape Cod
- 2 Cape Cod to Sandy Hook
- 3 Sandy Hook to Cape Henry
- 4 Cape Henry to Key West
- 5 Gulf of Mexico, Puerto Rico, and Virgin Islands

Great Lakes
- 6 The Great Lakes and their Connecting Waterways

Pacific Coast
- 7 California, Oregon, Washington and Hawaii
- 8 Alaska - - Dixon Entrance to Cape Spencer
- 9 Alaska - - Cape Spencer to Beaufort Sea



# Preface

The United States Coast Pilot is published by the National Ocean Service (NOS), Office of Coast Survey, National Oceanic and Atmospheric Administration (NOAA), pursuant to the Act of 6 August 1947 (33 U.S.C. 883a and b) and the Act of 22 October 1968 (44 U.S.C. 1310).

The Coast Pilot supplements the navigational information shown on the nautical charts. The sources for updating the Coast Pilot include but are not limited to field inspections conducted by NOAA, information published in Notices to Mariners, reports from NOAA Hydrographic vessels and field parties, information from other Government agencies, State and local governments, maritime and pilotage associations, port authorities, and mariners.

This volume of Coast Pilot 6, Great Lakes: Lakes Ontario, Erie, Huron, Michigan, and Superior and St. Lawrence River, cancels the (29th) Edition.

**Notice .–Amendments are issued to this publication through U.S. Coast Guard Local Notices to Mariners. A subscription to the Local Notice to Mariners is available upon application to the appropriate Coast Guard District Commander (Aids to Navigation Branch). Consult the Appendix for addresses. All amendments are also issued in National Imagery and Mapping Agency to Mariners. Mariners may also download and print amendments from the Internet at http://critcorr.ncd.noaa.gov/..**

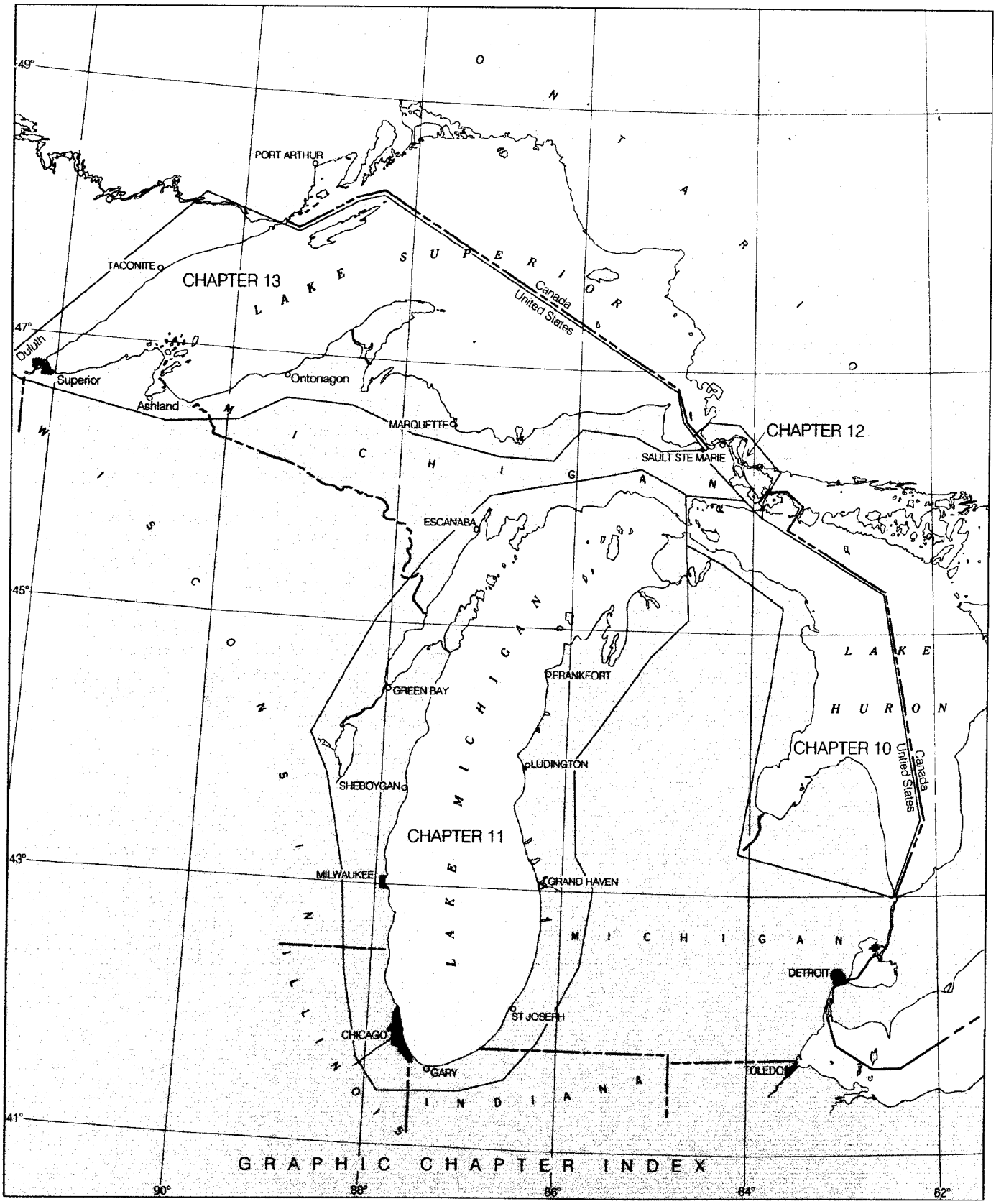
Prior editions of this volume contained many Canadian topics affecting the Great Lakes mariner and descriptive text of Canadian waters and shoreline.

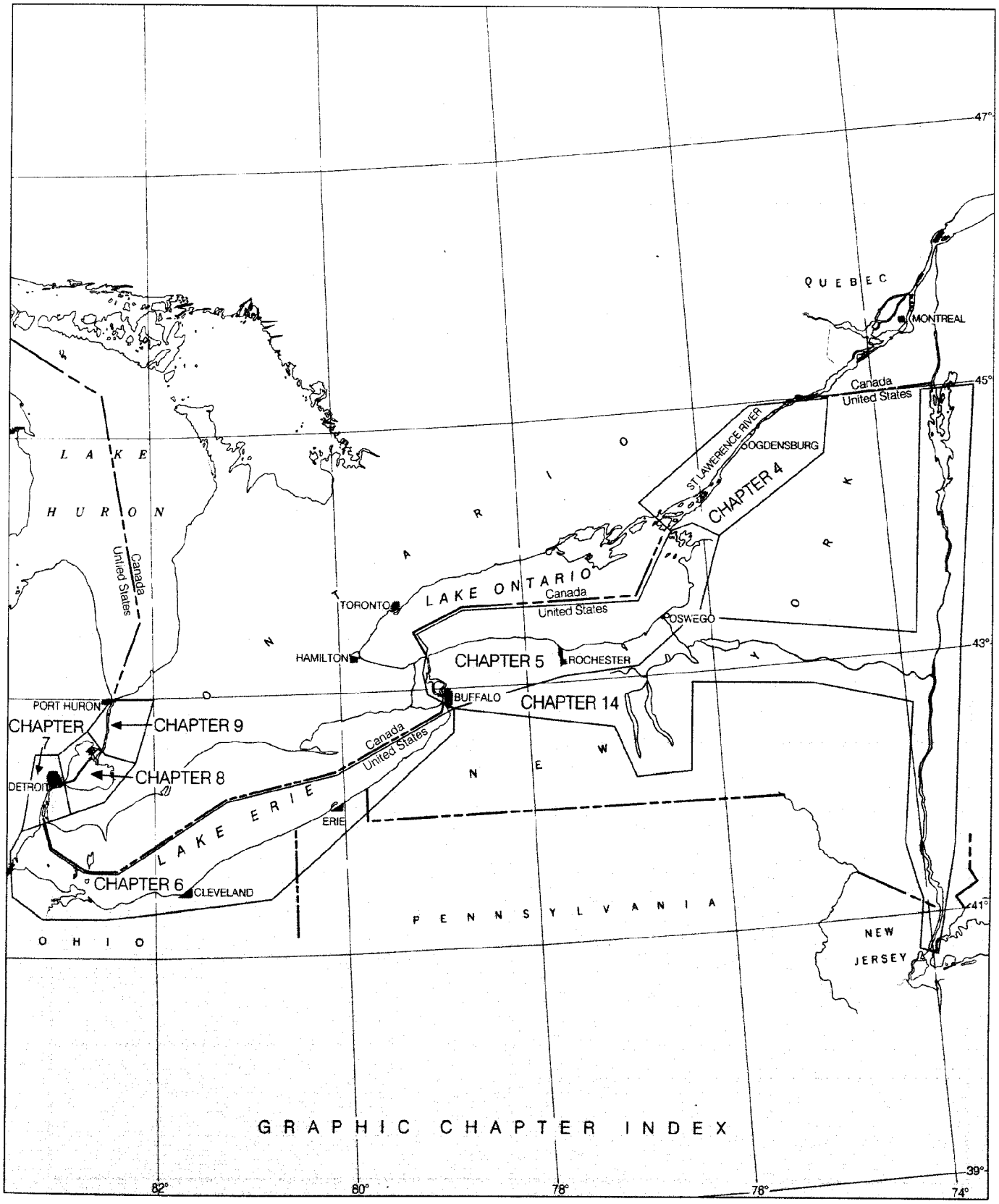
This edition contains Canadian descriptive text relating to the coterminous waterways of the United States and Canada. Other waterways contained in this volume are limited to descriptions of United States waters and shoreline.

For complete coverage of Canadian waters, consult the Canadian Sailing Directions.

Mariners and others are urged to report promptly to the National Ocean Service, errors, omissions, or any conditions found to differ from or to be additional to those published in the Coast Pilot or shown on the charts in order that they may be fully investigated and proper corrections made. A Coast Pilot Report form is included in the back of this book and a Marine Information Report form is published in the National Imagery and Mapping Agency Notice to Mariners for your convenience. These reports and/or suggestions for increasing the usefulness of the Coast Pilot should be sent to

Chief, Coast Pilot Branch (N/CS51)
Office of Coast Survey
National Ocean Service, NOAA
1315 East-West Highway
Silver Spring, MD 20910-3282


49°
47°
45°
43°
41°
90°
88°
86°
84°
82°
ONTARIO
PORT ARTHUR
TACONITE
CHAPTER 13
LAKE SUPERIOR
Canada
United States
Duluth
Superior
Ontonagon
Ashland
MARQUETTE
CHAPTER 12
SAULT STE MARIE
WISCONSIN
MICHIGAN
ESCANABA
LAKE MICHIGAN
GREEN BAY
FRANKFORT
LAKE HURON
CHAPTER 10
LUDINGTON
SHEBOYGAN
CHAPTER 11
MILWAUKEE
GRAND HAVEN
MICHIGAN
DETROIT
ILLINOIS
ST JOSEPH
CHICAGO
GARY
TOLEDO
INDIANA
GRAPHIC CHAPTER INDEX




GRAPHIC CHAPTER INDEX

# Record of Changes

| CHANGE NO. | FROM NOTICE TO MARINERS NO. | ENTERED BY | DATE ENTERED |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# Contents


| | | | Page |
|---|---|---|---|
| Chapter | 1. | GENERAL INFORMATION | 1 |
| Chapter | 2. | NAVIGATION REGULATIONS | 32 |
| Chapter | 3. | THE GREAT LAKES | 107 |
| Chapter | 4. | ST. LAWRENCE RIVER ABOVE ST. REGIS | 115 |
| Chapter | 5. | LAKE ONTARIO | 126 |
| Chapter | 6. | LAKE ERIE | 145 |
| Chapter | 7. | DETROIT RIVER | 192 |
| Chapter | 8. | LAKE ST. CLAIR | 204 |
| Chapter | 9. | ST. CLAIR RIVER | 210 |
| Chapter | 10. | LAKE HURON | 218 |
| Chapter | 11. | LAKE MICHIGAN | 240 |
| Chapter | 12. | ST. MARYS RIVER | 330 |
| Chapter | 13. | LAKE SUPERIOR | 341 |
| Chapter | 14. | HUDSON RIVER, NEW YORK CANALS, AND LAKE CHAMPLAIN | 369 |
| Appendix | | | 375 |
| T-Tables | | | (Follows Appendix) |
| | | Climatological | T-1 |
| | | Meteorological | T-16 |
| | | Distances | T-21 |
| | | Conversion, Compass Points to Degrees | T-30 |
| | | Coastal Warning Displays | T-31 |
| | | Standard Abbreviations for Broadcasts | T-32 |
| | | Measurement and Conversion Factors | T-35 |
| | | Conversion Factors | T-36 |
| | | Metric Style Guide | T-38 |
| Index | | | I-1 |
| Coast Pilot Report form | | | (Follows Index) |

# 1. GENERAL INFORMATION

(1) **UNITED STATES COAST PILOT.**–The National Ocean Service Coast Pilot is a series of nine nautical books that covers a wide variety of information important to navigators of U.S. coastal and intracoastal waters, and the waters of the Great Lakes. Most of this book information cannot be shown graphically on the standard nautical charts and is not readily available elsewhere. The subjects in the Coast Pilot include, but are not limited to, channel descriptions, anchorages, bridge and cable clearances, currents, tide and water levels, prominent features, pilotage, towage, weather, ice conditions, wharf descriptions, dangers, routes, traffic separation schemes, small-craft facilities, and Federal regulations applicable to navigation.

(2) **Notice.–Amendments are issued to this publication through U.S. Coast Guard Local Notices to Mariners. A subscription to the Local Notice to Mariners is available upon application to the appropriate Coast Guard District Commander (Aids to Navigation Branch). Consult appendix for address. All amendments are also issued in National Imagery and Mapping Agency Notices to Mariners.**

(3) **Bearings.**–These are true and are expressed in degrees from 000° (north) to 359°, measured clockwise. General bearings are expressed by initial letters of the points of the compass (e.g., N, NNE, NE, etc.). Adjective and adverb endings, except in chapter 2, Navigation Regulations, have been discarded. Wherever precise bearings are intended degrees are used. Light-sector bearings are toward the light.

(4) **Bridges and Cables.**–Vertical clearances of bridges and overhead cables are in feet (meters) above Low Water Datum unless otherwise stated. When the water level is above Low Water Datum, the bridge and overhead cable clearances given in this Coast Pilot and shown on the charts should be reduced accordingly. Clearances of drawbridges are for the closed position, although the open clearances are also given for vertical-lift bridges. Clearances given in the Coast Pilot are those approved for nautical charting, and are supplied by the U.S. Coast Guard (bridges) and U.S. Army Corps of Engineers (cables); they may be as-built (verified by actual inspection after completion of structures) or authorized (design values specified in permit issued prior to construction). No differentiation is made in the Coast Pilot between as-built and authorized clearances. (See charts for horizontal clearances of bridges, as these are given in the Coast Pilot only when they are less than 50 feet (15 meters).) Submarine cables are rarely mentioned.

(5) **Cable ferries.**–Cable ferries are guided by cables fastened to shore and sometimes propelled by a cable rig attached to the shore. Generally, the cables are suspended during crossings and dropped to the bottom when the ferries dock. Where specific operating procedures are known they are mentioned in the text. Since operating procedures vary, mariners are advised to exercise extreme caution and seek local knowledge. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

(6) **Courses.**–These are true and are given in degrees clockwise from 000° (north) to 359°. The courses given are the courses to be made good.

(7) **Currents.**–Stated current velocities are the averages at strength. Velocities are in knots, which are nautical miles per hour, or in statute miles per hour. Directions are the true directions to which the currents set.

(8) **Depths.**–Depth is the vertical distance from the chart datum to the bottom and is expressed in the same units (feet, meters, or fathoms) as soundings on the applicable chart. (See Chart Datum this chapter for further detail.) The **controlling depth** of a channel is the least depth within the limits of the channel; it restricts the safe use of the channel to drafts of less than that depth. The **centerline controlling depth** of a channel applies only to the channel centerline; lesser depths may exist in the remainder of the channel. The **midchannel controlling depth** of a channel is the controlling depth of only the middle half of the channel. **Federal project depth** is the design dredging depth of a channel constructed by the Corps of Engineers, U.S. Army; the project depth may or may not be the goal of maintenance dredging after completion of the channel, and, for this reason, project depth must not be confused with controlling depth. **Depths alongside wharves** usually have been reported by owners and/or operators of the waterfront facilities, and have not been verified by Government surveys; since these depths may be subject to change, local authorities should be consulted for the latest controlling depths.

(9) In general, the Coast Pilot gives the project depths for deep-draft ship channels maintained by the U.S. Army Corps of Engineers. The latest controlling depths are usually shown on the charts and published in the Notices to Mariners. For other channels, the latest controlling depths available at the time of publication are given. **In all cases, however, mariners are advised to consult with pilots, port and local authorities, and Federal and State authorities for the latest channel controlling depths.**

(10) **Under-keel clearances.**–It is becoming increasingly evident that economic pressures are causing mariners to navigate through waters of barely adequate depth, with under-keel clearances being finely assessed from the charted depths, predicted water levels, and depths recorded by echo sounders.

(11) It cannot be too strongly emphasized that even charts based on modern surveys may not show all submerged obstructions or the shoalest depths, and actual water levels may be appreciably lower than those predicted.

(12) In many ships an appreciable correction must be applied to shoal soundings recorded by echo sounders due to the horizontal distance between the transducers. This separation correction, which is the amount by which recorded depths therefore exceed true depths, increases with decreasing depths to a maximum equal to half the distance apart of the transducers; at this maximum the transducers are aground. Ships whose transducers are more than 6 feet (1.8 meters) apart should construct a table of true and recorded depths using the Traverse Tables. (Refer to discussion of echo soundings elsewhere in chapter 1.)

(13) Other appreciable corrections, which must be applied by many ships, are for settlement and squat. These corrections depend on the depth of water below the keel, the hull form, and speed of the ship.

(14) Settlement causes the water level around the ship to be lower than would otherwise be the case. It will always cause echo soundings to be less than they would otherwise be. Settlement is appreciable when the depth is less than seven times the draft of the ship, and increases as the depth decreases and the speed increases.

(15) Squat denotes a change in trim of a ship underway, relative to her trim when stopped. It usually causes the stern of a vessel to sit deeper in the water. However, it is reported that in the case of mammoth ships squat causes the bow to sit deeper. Depending on the location of the echo sounding transducers, this may cause the recorded depth to be greater or less than it ought to be.

(16) **Distances.**–These are in statute miles unless otherwise stated. A statute mile is 5,280 feet, 1,760 yards, or about 0.87 nautical mile.

(17) **Heights.**–These are in feet (meters) above the chart datum used for that purpose on the charts, usually Low Water Datum.

(18) **Light and fog signal characteristics.**–These are not described, and light sectors and visible ranges are normally not defined. (See United States and Canadian Coast Guard Light Lists.)

(19) **Obstructions.**–Wrecks and other obstructions are mentioned only if of a relatively permanent nature and in or near normal traffic routes.

(20) **Potable Water Intakes** are shown on NOS charts of the Great Lakes and connecting waters with the symbol PWI. Potable water intakes are not generally mentioned in the Coast Pilot. (See Potable Water Intakes, chapter 3, and **21 CFR 1250.93,** chapter 2.)

(21) **Radio aids to navigation.**–These are seldom described. (See United States and Canadian Coast Guard Light Lists and National Imagery and Mapping Agency and Canadian Coast Guard Radio Navigational Aids publications.)

(22) **Ranges.**–These are not fully described. **"A 339° Range"** means that the rear structure bears 339° from the front structure. (See United States and Canadian Coast Guard Light Lists.)

(23) **Reported information.**–Information received by NOS from various sources concerning depths, dangers, currents, facilities, and other subjects, which has not been verified by Government surveys or inspections, is often included in Coast Pilot; such **unverified information** is qualified as "reported", and should be regarded with caution.

(24) **Time.**–Unless otherwise stated, all times are given in local standard time in the 24-hour system. (Noon is 1200, 2:00 p.m. is 1400, and midnight is 0000.)

(25) **Winds.**–Directions are the true directions from which the winds blow. Unless otherwise indicated, speeds are given in statute miles per hour.

## NOTICES TO MARINERS

(26) **Notices to Mariners** are published by Federal agencies to advise operators of vessels of marine information affecting the safety of navigation. The notices include changes in aids to navigation, depths in channels, bridge and overhead cable clearances, reported dangers, and other useful marine information. They should be used routinely for updating the latest editions of nautical charts and related publications.

(27) **Local Notice to Mariners** is issued by each Coast Guard District Commander for the waters under his jurisdiction. (See appendix for Coast Guard districts covered by this volume.) These notices are usually published weekly and may be obtained without cost by making application to the appropriate District Commander, or by contacting the Coast Guard internet website address, **http://www.navcen.uscg.mil/lnm**.

(28) **Notice to Mariners,** published weekly by the National Imagery and Mapping Agency, is prepared jointly with NOS and the Coast Guard. These notices contain selected items from the Local Notices to Mariners and other reported marine information required by deep-draft vessels operating in both **foreign** and **domestic** waters. Special items, covering a variety of subjects and generally not discussed in the Coast Pilot or shown on nautical charts, are published annually in Notice to Mariners No. 1. These items are important to the mariner and should be read for future reference. These notices may be obtained by operators of deep-draft vessels, without cost, by making application to **National Imagery and Mapping Agency** (see National Imagery and Mapping Agency Procurement Information, indexed as such, in the Appendix).

(29) Notices and reports of **improved channel depths** are also published by district offices of the Corps of Engineers, U.S. Army. (See appendix for districts covered by this volume.) Although information from these notices/reports affecting NOS charts and related publications is usually published in the Notices to Mariners, the local district engineer office should be consulted where depth information is critical.

(30) **Marine Broadcast Notices to Mariners** are made by the Coast Guard through Coast Guard, Navy, and some commercial radio stations to report deficiencies and important changes in aids to navigation. (See Radio Warnings and Weather, this chapter.)

(31) Vessels operating within the limits of the Coast Guard districts can obtain information affecting NOS charts and related publications from the Local Notices to Mariners. Small craft using the Intracoastal Waterway and other waterways and small harbors within the United States that are not normally used by deep-draft vessels will require the Local Notices to Mariners to keep charts and related publications up-to-date.

## U.S. GOVERNMENT AGENCIES PROVIDING MARITIME SERVICES

(32) **National Ocean Service (NOS),** National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.–The National Ocean Service provides charts and related publications for the safe navigation of marine and air commerce, and provides basic data for engineering and scientific purposes and for other commercial and industrial needs. The principal facilities of NOS are located in Silver Spring, MD.; in Norfolk, Va. (Atlantic Marine Center); and in Seattle, Wash. (Pacific Marine Center). NOAA ships are based at the marine centers. These offices maintain files of charts and other publications which are available for the use of the mariners, who are invited to avail themselves of the facilities afforded. (See appendix for addresses.)

(33) **Sales agents** for Charts, the Coast Pilot, Hydrographs of Lake Levels, and Great Lakes Water Levels of the National Ocean Service are located in many U.S. ports and in some foreign ports. A list of authorized sales agents and chart catalogs may be had free upon request from National Ocean Service, Distribution Division (N/ACC3). (See appendix for address.)

(34) **Nautical charts** are published primarily for the use of the mariner, but serve the public interest in many other ways. They are compiled principally from NOS basic field surveys, supplemented by data from other Government organizations.

(35) **National Data Buoy Center Meteorological Buoys.**–The National Data Buoy Center (NDBC) deploys moored meteorological buoys which provide weather data directly to the mariner as well as to marine forecasters. Recently (reported January 1998), a disproportionate number of these buoys have had mooring failures due to abrasion of the nylon mooring line by trawls, tow lines, etc.

(36) These buoys have a watch circle radius (WCR) of 2,000 to 4,000 yards from assigned position (AP). In addition, any mooring

in waters deeper than 1,000 feet will have a floating "loop" or catenary that may be as little as 500 feet below the surface. This catenary could be anywhere within the buoy's WCR. Any underwater activity within this radius may contact the mooring causing a failure.

(37) To estimate a buoy's WCR in yards, divide the charted depth (in feet) by three. For example, the WCR of a buoy moored at a charted depth of 12,000 feet can be estimated at 4,000 yards.

(38) To avoid cutting or damaging a moor, mariners are urged to exercise extreme caution when navigating in the vicinity of meteorological buoys and to remain well clear of the watch circle. If a mooring is accidentally contacted or cut, please notify NDBC at (228) 688-2835 or (228) 688-2436.

(39) For further information relating to these buoys consult the NDBC home page (**http://seaboard.ndbc.noaa.gov**).

(40) **Coast Guard,** Department of Transportation.–The Coast Guard has among its duties the enforcement of the laws of the United States on the high seas and in coastal and inland waters of the U.S. and its possessions; enforcement of navigation and neutrality laws and regulations; establishment and enforcement of navigational regulations upon the Inland Waters of the United States, including the establishment of a demarcation line separating the high seas from waters upon which U.S. navigation rules apply; administration of the Oil Pollution Act of 1961, as amended; establishment and administration of vessel anchorages; approval of bridge locations and clearances over navigable waters; administration of the alteration of obstructive bridges; regulation of drawbridge operations; inspection of vessels of the Merchant Marine; admeasurement of vessels; documentation of vessels; preparation and publication of merchant vessel registers; registration of stack insignia; port security; issuance of Merchant Marine licenses and documents; search and rescue operations; investigation of marine casualties and accidents, and suspension and revocation proceedings; destruction of derelicts; operation of aids to navigation; publication of Light Lists and Local Notices to Mariners; and operation of ice-breaking facilities.

(41) The Coast Guard, with the cooperation of coast radio stations of many nations, operates the **Automated Mutual-assistance Vessel Rescue System (AMVER).** It is an international maritime mutual assistance program which provides important aid to the development and coordination of search and rescue (SAR) efforts in many offshore areas of the world. Merchant ships of all nations making offshore passages are encouraged to voluntarily send movement (sailing) reports and periodic position reports to the AMVER Center at Coast Guard New York via selected radio stations. Information from these reports is entered into an electronic computer which generates and maintains dead reckoning positions for the vessels. Characteristics of vessels which are valuable for determining SAR capability are also entered into the computer from available sources of information.

(42) A worldwide communications network of radio stations supports the AMVER System. Propagation conditions, location of vessel, and traffic density will normally determine which station may best be contacted to establish communications. To ensure that no charge is applied, all AMVER reports should be passed through specified radio stations. Those stations which currently accept AMVER reports and apply no coastal station, ship station, or landline charge are listed in each issue of the "AMVER Bulletin" publication. Also listed are the respective International radio call signs, locations, frequency bands, and hours of operation. The "AMVER Bulletin" is available from AMVER Maritime Relations, U.S. Coast Guard, Battery Park Building, NY 10004, telephone: (212) 668-7764. Although AMVER reports may be sent through nonparticipating stations, the Coast Guard cannot reimburse the sender for any charges applied.

(43) Information concerning the predicted location and SAR characteristics of each vessel known to be within the area of interest is made available upon request to recognized SAR agencies of any nation or vessels needing assistance. Predicted locations are only disclosed for reasons related to marine safety.

(44) Benefits of AMVER participation to shipping include: (1) improved chances of aid in emergencies, (2) reduced number of calls for assistance to vessels not favorably located, and (3) reduced time lost for vessels responding to calls for assistance. An AMVER participant is under no greater obligation to render assistance during an emergency than a vessel who is not participating.

(45) All AMVER messages should be addressed to **Coast Guard New York** regardless of the station to which the message is delivered, except those sent to Canadian stations which should be addressed to **AMVER Halifax** or **AMVER Vancouver** to avoid incurring charges to the vessel for these messages.

(46) Instructions guiding participation in the AMVER System are available in the following languages: Chinese, Danish, Dutch, English, French, German, Greek, Italian, Japanese, Korean, Norwegian, Portuguese, Polish, Russian, Spanish, and Swedish. The AMVER Users Manual is available from: AMVER Maritime Relations, U.S. Coast Guard, address above; Commander, Atlantic Area, U.S. Coast Guard, Governors Island, N.Y. 10004; Commander, Pacific Area, U.S. Coast Guard, Coast Guard Island, Alameda, Calif. 94501; and at U.S. Coast Guard District Offices, Marine Safety Offices, Marine Inspection Offices, and Captain of the Port Offices in major U.S. ports. Requests for instructions should state the language desired if other than English.

(47) For AMVER participants bound for U.S. ports there is an additional benefit. AMVER participation via messages which include the necessary information is considered to meet the requirements of 33 CFR 160. (See **33 CFR 160.201,** chapter 2, for rules and regulations.)

(48) **AMVER Reporting Required**–U.S. Maritime Administration regulations effective August 1, 1983, state that certain U.S. flag vessels and foreign flag "War Risk" vessels must report and regularly update their voyages to the AMVER Center. This reporting is required of the following: (a) U.S. flag vessels of 1,000 gross tons or greater, operating in foreign commerce; (b) foreign flag vessels of 1,000 gross tons or greater, for which an Interim War Risk Insurance Binder has been issued under the provisions of Title XII, Merchant Marine Act, 1936.

(49) Details of the above procedures are contained in the AMVER Users Manual. The system is also published in NIMA Pub. 117.

(50) Search and Rescue Operation procedures are contained in the International Maritime Organization (IMO) SAR Manual (MERSAR). U.S. flag vessels may obtain a copy of MERSAR from local Coast Guard Marine Safety Offices and Marine Inspection Offices or by writing to U.S. Coast Guard (G-OSR), Washington, D.C. 20593-0001. Other flag vessels may purchase MERSAR directly from IMO.

(51) The Coast Guard conducts and/or coordinates **search and rescue** operations for surface vessels and aircraft that are in distress or overdue. (See Distress Signals and Communication Procedures this chapter.)

(52) **Light Lists,** published by the Coast Guard, describe aids to navigation, consisting of lights, fog signals, buoys, lightships, daybeacons, and electronic aids, in United States (including Puerto Rico and U.S. Virgin Islands) and contiguous Canadian

waters. Light Lists are for sale by the Government Printing Office (see appendix for address). and by sales agents in the principal seaports. Mariners should refer to these publications for detailed information regarding the characteristics and visibility of lights, and the descriptions of light structures, lightships, buoys, fog signals, and electronic aids.

(53) **Documentation** (issuance of certificates of registry, enrollments, and licenses), admeasurements of vessels, and administration of the various navigation laws pertaining thereto are functions of the Coast Guard. Yacht commissions are also issued, and certain undocumented vessels required to be numbered by the Federal Boat Safety Act of 1971 are numbered either by the Coast Guard or by a State having an approved numbering system (the latter is most common). Owners of vessels may obtain the necessary information from any Coast Guard District Commander, Marine Safety Office, or Marine Inspection Office. Coast Guard District Offices, Coast Guard Stations, Marine Safety Offices, Captain of the Port Offices, Marine Inspection Offices, and Documentation Offices are listed in the appendix. (Note: A Marine Safety Office performs the same functions as those of a Captain of the Port and a Marine Inspection Office. When a function is at a different address than the Marine Safety Office, it will be listed separately in the appendix.)

(54) **National Imagery and Mapping Agency (NIMA),** Department of Defense.–The National Imagery and Mapping Agency provides hydrographic, navigational, topographic, and geodetic data, charts, maps, and related products and services to the Armed Forces, other Federal agencies, the Merchant Marine and mariners in general. Publications include Sailing Directions, List of Lights, Distances Between Ports, Radio Navigational Aids, International Code of Signals, American Practical Navigator (Bowditch), and Notice to Mariners. (See National Imagery and Mapping Agency Procurement Information, indexed as such, in the Appendix.)

(55) **U.S. Army Corps of Engineers, (USACE),** Department of the Army.–The Corps of Engineers has charge of the improvement of the rivers and harbors of the United States and of miscellaneous other civil works which include the administration of certain Federal laws enacted for the protection and preservation of navigable waters of the United States; the establishment of regulations for the use, administration, and navigation of navigable waters; the establishment of harbor lines; the removal of sunken vessels obstructing or endangering navigation; and the granting of permits for structures or operations in navigable waters, and for discharges and deposits of dredged and fill materials in these waters.

(56) Information concerning the various ports, improvements, channel depths, navigable water, and the condition of the Intracoastal Waterways in the areas under their jurisdiction may be obtained direct from the District Engineer Offices. (See appendix for addresses.)

(57) **Restricted areas** in most places are defined and regulations governing them are established by the U.S. Army Corps of Engineers. The regulations are enforced by the authority designated in the regulations, and the areas are shown on the large-scale charts of NOS. Copies of the regulations may be obtained at the District offices of the Corps of Engineers. The regulations are also included in the appropriate Coast Pilots.

(58) **Fishtraps.**–The Corps of Engineers has general supervision of location, construction, and manner of maintenance of all traps, weirs, pounds, or other fishing structures in the navigable waters of the United States. Where State and/or local controls are sufficient to regulate these structures, including that they do not interfere with navigation, the Corps of Engineers leaves such regulation to the State or local authority. See 33 CFR 330 (not carried in this Pilot) for applicable Federal regulations. Construction permits issued by the Engineers specify the lights and signals required for the safety of navigation.

(59) **Fish havens,** artificial reefs constructed to attract fish, can be established in U.S. coastal waters only as authorized by a Corps of Engineers permit; the permit specifies the location, extent, and depth over these "underwater junk piles".

(60) **National Weather Service (NWS),** National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.–The National Weather Service provides marine weather forecasts and warnings for the U.S. coastal waters, the Great Lakes, offshore waters, and high seas areas. Scheduled marine forecasts are issued four times daily from more than 20 **National Weather Service Forecast Offices (WSFOs)** around the country, operating 24 hours a day. Marine services are also provided by over 50 **National Weather Service Offices** with local areas of responsibility. (See appendix for Weather Service Forecast Offices and Weather Service Offices for the area covered by this Coast Pilot.)

(61) Typically, the forecasts contain information on wind speed and direction, wave heights, visibility, weather, and a general synopsis of weather patterns affecting the region. The forecasts are supplemented with special marine warnings and statements, radar summaries, marine observations, small-craft advisories, gale warnings, storm warnings and various categories of tropical cyclone warnings e.g., tropical depression, tropical storm and hurricane warnings. Specialized products such as coastal flood, seiche, and tsunami warnings, heavy surf advisories, low-water statements, ice forecasts and outlooks, and lakeshore warnings and statements are issued as necessary.

(62) The principal means of disseminating marine weather services and products in the coastal areas is **NOAA Weather Radio.** This network of more than 350 stations nationwide is operated by the NWS and provides continuous broadcasts of weather information for the general public. (See Radio Navigation Warnings and Weather, this chapter.)

(63) NWS marine weather products are also disseminated to marine users through the broadcast facilities of the Coast Guard, Navy, and commercial marine radio stations. Details on these broadcasts including times, frequencies, and broadcast content are listed in the joint NWS/Navy publication Selected Worldwide Marine Weather Broadcasts. For marine weather services in the coastal areas, the NWS publishes a series of Marine Weather Services Charts showing locations of NOAA Weather Radio stations, telephone numbers of recorded weather messages and NWS offices, and other useful marine weather information.

(64) Ships of all nations share equally in the effort to report weather observations. These reports enable meteorologists to create a detailed picture of wind, wave, and weather patterns over the open waters that no other data source can provide and upon which marine forecasts are based. The effectiveness and reliability of these forecasts and warnings plus other services to the marine community are strongly linked to the observations received from mariners. There is an especially urgent need for ship observations in the coastal waters, and the NWS asks that these be made and transmitted whenever possible. Many storms originate and intensify in coastal areas. There may be a great difference in both wind

direction and speed between the open sea, the offshore waters, and on the coast itself.

(65) Information on how ships, commercial fishermen, offshore industries, and others in the coastal zone may participate in the marine observation program is available from **National Weather Service Port Meteorological Officers (PMOs).** Port Meteorological Officers are located in major U.S. port cities and the Republic of Panama, where they visit ships in port to assist masters and mates with the weather observation program, provide instruction on the interpretation of weather charts, calibrate barometers and other meteorological instruments, and discuss marine weather communications and marine weather requirements affecting the ships' operations. (See appendix for addresses of Port Meteorological Officers in or near the area covered by this Coast Pilot.)

(66) **National Environmental Satellite, Data, and Information Service (NESDIS),** National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.–Among its functions, NESDIS archives, processes, and disseminates the nonrealtime meteorological and oceanographic data collected by Government agencies and private institutions. Marine weather observations are collected from ships at sea on a voluntary basis. About one million observations are received annually at NESDIS's National Climatic Center. They come from vessels representing every maritime nation. These observations, along with land data, are returned to the mariners in the form of climatological summaries and atlases for coastal and ocean areas. They are available in such NOAA publications as the **U.S. Coast Pilots, Mariners Weather Log,** and **Local Climatological Data, Annual Summary.** They also appear in the National Imagery and Mapping Agency's **Pilot Chart Atlases and Sailing Directions Planning Guides.**

(67) **Environmental Protection Agency (EPA).**–The U.S. Environmental Protection Agency provides coordinated governmental action to assure the protection of the environment by abating and controlling pollution on a systematic basis. The ocean dumping permit program of the Environmental Protection Agency provides that, except when authorized by permit, the dumping of any material into the ocean is prohibited by the "Marine Protection, Research and Sanctuaries Act of 1972, Public Law 92-532," as amended (33 USC 1401 et seq.).

(68) Permits for the **dumping of dredged material** into waters of the United States, including the territorial sea, and into ocean waters are issued by the Corps of Engineers. Permits for the dumping of fill material into waters of the United States, including the territorial sea, are also issued by the Corps of Engineers. Permits for the dumping of other material in the territorial sea and ocean waters are issued by the Environmental Protection Agency.

(69) Corps of Engineers regulations relating to the above are contained in **33 CFR 323-324**; Environmental Protection Agency regulations are in **40 CFR 220-229**. (See Disposal Sites this chapter.)

(70) Persons or organizations who want to file for an application for an ocean dumping permit should write the Environmental Protection Agency Regional Office for the region in which the port of departure is located. (See appendix for addresses of regional offices and States in the EPA coastal regions.)

(71) The letter should contain the name and address of the applicant; name and address of person or firm; the name and usual location of the conveyance to be used in the transportation and dumping of the material involved; a physical description where appropriate; and the quantity to be dumped and proposed dumping site.

(72) Everyone who writes EPA will be sent information about a final application for a permit as soon as possible. This final application is expected to include questions about the description of the process or activity giving rise to the production of the dumping material; information on past activities of applicant or others with respect to the disposal of the type of material involved; and a description about available alternative means of disposal of the material with explanations about why an alternative is thought by the applicant to be inappropriate.

(73) **Federal Communications Commission.**–The Federal Communications Commission controls non-Government radio communications in the United States, Guam, Puerto Rico, and the Virgin Islands. Commission inspectors have authority to board ships to determine whether their radio stations comply with international treaties, Federal Laws, and Commission regulations. The commission has field offices in the principal U.S. ports. (See appendix for addresses.) Information concerning ship radio regulations and service documents may be obtained from the Federal Communications Commission, Washington, D.C. 20554, or from any of the field offices.

(74) **Customs Service,** Department of the Treasury.–The U.S. Customs Service administers certain laws relating to: entry and clearance of vessels and permits for certain vessel movements between points in the United States; prohibitions against coastwise transportation of passengers and merchandise; salvage, dredging and towing by foreign vessels; certain activities of vessels in the fishing trade; regular and special tonnage taxes on vessels; the landing and delivery of foreign merchandise (including unlading, appraisement, lighterage, drayage, warehousing, and shipment in bond); collection of customs duties, including duty on imported pleasure boats and yachts and 50+6C duty on foreign repairs to American vessels engaged in trade; customs treatment of sea and ship's stores while in port and the baggage of crewmen and passengers; illegally imported merchandise; and remission of penalties or forfeiture if customs or navigation laws have been violated. The Customs Service also cooperates with many other Federal agencies in the enforcement of statutes they are responsible for. Customs districts and ports of entry, including customs stations, are listed in the appendix.

(75) The Customs Service may issue, without charge, a **cruising license,** valid for a period of up to 6 months and for designated U.S. waters, to a yacht of a foreign country which has a reciprocal agreement with the United States. A foreign yacht holding a cruising license may cruise in the designated U.S. waters and arrive at and depart from U.S. ports without entering or clearing at the customhouse, filing manifests, or obtaining or delivering permits to proceed, provided it does not engage in trade or violate the laws of the United States or visit a vessel not yet inspected by a Customs Agent and does, within 24 hours of arrival at each port or place in the United States, report the fact of arrival to the nearest customhouse. Countries which have reciprocal agreements granting these privileges to United States yachts are Argentina, Australia, Bahama Islands, Bermuda, Canada, Federal Republic of Germany, Great Britain, Greece, Honduras, Jamaica, Liberia, the Netherlands, and New Zealand. Further information concerning cruising licenses may be obtained from the headquarters port for the customs district in which the license is desired. U.S. yacht owners planning cruises to foreign ports may contact the nearest customs district headquarters as to customs requirements.

(76) **Immigration and Naturalization Service,** Department of Justice.–The Immigration and Naturalization Service administers the laws relating to admission, exclusion, and deportation of aliens, the registration and fingerprinting of aliens, and the naturalization of aliens lawfully resident in the United States.

(77) The designated ports of entry for aliens are divided into three classes. Class A is for all aliens. Class B is only for aliens who at the time of applying for admission are lawfully in possession of valid resident aliens' border-crossing identification cards or valid nonresident aliens' border-crossing identification cards or are admissible without documents under the documentary waivers contained in **8 CFR 212.1(a)**. Class C is only for aliens who are arriving in the United States as crewmen as that term is defined in Section 101(a) (10) of the Immigration and Nationality Act. (The term "crewman" means a person serving in any capacity on board a vessel or aircraft.) No person may enter the United States until he has been inspected by an immigration officer. A list of the offices covered by this Coast Pilot is given in the appendix.

(78) **Animal and Plant Health Inspection Service,** Department of Agriculture.–The Agricultural Quarantine Inspection Program and Animal Health Programs of this organization are responsible for protecting the Nation's animal population, food and fiber crops, and forests from invasion by foreign pests. They administer agricultural quarantine and restrictive orders issued under authority provided in various acts of Congress. The regulations prohibit or restrict the importation or interstate movements of live animals, meats, animal products, plants, plant products, soil, injurious insects, and associated items that may introduce or spread plant pests and animal diseases which may be new to or not widely distributed within the United States or its territories. Inspectors examine imports at ports of entry as well as the vessel, its stores, and crew or passenger baggage.

(79) The Service also provides an inspection and certification service for exporters to assist them in meeting the quarantine requirements of foreign countries. (See appendix for a list of ports where agricultural inspectors are located and inspections conducted.)

(80) **Public Health Service,** Department of Health and Human Services.–The Public Health Service administers foreign quarantine procedures at U.S. ports of entry.

(81) All vessels arriving in the United States are subject to public health inspection. Vessels subject to routine boarding for quarantine inspection are only those which have had on board during the 15 days preceding the date of expected arrival or during the period since departure (whichever period of time is shorter) the occurrence of any death or ill person among passengers or crew (including those who have disembarked or have been removed). The master of a vessel must report such occurrences immediately by radio to the quarantine station at or nearest the port at which the vessel will arrive.

(82) In addition, the master of a vessel carrying 13 or more passengers must report by radio 24 hours before arrival the number of cases (including zero) of diarrhea in passengers and crew recorded in the ship's medical log during the current cruise. All cases that occur after the 24 hour report must also be reported not less than 4 hours before arrival.

(83) "Ill person" means person who:

(84) 1. Has a temperature of 100°F (or 38°C) or greater, accompanied by a rash, glandular swelling, or jaundice, or which has persisted for more than 48 hours; or

(85) 2. Has diarrhea, defined as the occurrence in a 24 hour period of three or more loose stools or of a greater than normal (for the person) amount of loose stools.

(86) Vessels arriving at ports under control of the United States are subject to sanitary inspection to determine whether measures should be applied to prevent the introduction, transmission, or spread of communicable disease.

(87) Specific public health laws, regulations, policies, and procedures may be obtained by contacting U.S. Quarantine Stations, U.S. Consulates or the Chief Program Operations, Division of Quarantine, Centers for Disease Control, Atlanta, Ga, 30333. (See appendix for addresses of U.S. Public Health Service Quarantine Stations.)

(88) **Food and Drug Administration (FDA),** Public Health Service, Department of Health and Human Services.–Under the provisions of the Control of Communicable Diseases Regulations (**21 CFR 1240**) and Interstate Conveyance Sanitation Regulations (**21 CFR 1250**), vessel companies operating in interstate traffic shall obtain potable water for drinking and culinary purposes only at watering points found acceptable to the Food and Drug Administration. Water supplies used in watering point operations must also be inspected to determine compliance with applicable Interstate Quarantine Regulations (**42 CFR 72**). These regulations are based on authority contained in the Public Health Service Act (PL 78-410). Penalties for violation of any regulation prescribed under authority of the Act are provided for under Section 368 (42 USC 271) of the Act.

(89) **Vessel Watering Points.**–FDA annually publishes a list of **Acceptable Vessel Watering Points**. This list is available from most FDA offices or from Interstate Travel Sanitation Subprogram Center for Food Safety and Applied Nutrition, FDA (HFF-312), 200 C Street SW., Washington, D.C. 20204. Current status of watering points can be ascertained by contacting any FDA office. (See appendix for addresses.)

## DISTRESS SIGNALS AND COMMUNICATION PROCEDURES

(90) **Coast Guard search and rescue operations.**–The Coast Guard conducts and/or coordinates search and rescue operations for surface vessels or aircraft that are in distress or overdue. Search and Rescue vessels and aircraft have special markings, including a wide slash of red-orange and a small slash of blue on the forward portion of the hull or fuselage. Other parts of aircraft, normally painted white, may have other areas painted red to facilitate observation. The cooperation of vessel operators with Coast Guard helicopters, fixed-wing aircraft, and vessels may mean the difference between life and death for some seaman or aviator; such cooperation is greatly facilitated by the prior knowledge on the part of vessel operators of the operational requirements of Coast Guard equipment and personnel, of the international distress signals and procedures, and of good seamanship.

(91) **Note.**–In August 1993, all Coast Guard communication stations and cutters discontinued watchkeeping on the distress frequency 500 kHz. Distress and other calls to Coast Guard communication stations may be made on any of the following HF single sideband radiotelephone channels: 424 (4134 kHz), 601 (6200 kHz), 816 (8240 kHz), or 1205 (12242 kHz).

(92) **International distress signals.**–(1) A signal made by radiotelegraphy or by any other signaling method consisting of the group "SOS" in Morse Code.

(93) (2) A signal sent by radiotelephony consisting of the spoken word "MAYDAY."

(94) (3) The International Flag Code Signal of NC.

(95) (4) A signal consisting of a square flag having above or below it a ball or anything resembling a ball.

(96) (5) Flames on the craft (as from a burning oil barrel, etc.).

(97) (6) A rocket parachute flare or hand flare showing a red light.

(98) (7) Rockets or shells, throwing red stars fired one at a time at short intervals.

(99) (8) Orange smoke, as emitted from a distress flare.

(100) (9) Slowly and repeatedly raising and lowering arms outstretched to each side.

(101) (10) A gun or other explosive signal fired at intervals of about 1 minute.

(102) (11) A continuous sounding of any fog-signal apparatus.

(103) (12) The radiotelegraph alarm signal.

(104) (13) The radiotelephone alarm signal.

(105) (14) Signals transmitted by emergency position-indicating radiobeacons.

(106) (15) A piece of orange-colored canvas with either a black square and circle or other appropriate symbol (for identification from the air).

(107) (16) A dye marker.

(108) **Radio distress procedures.**–Distress calls in the Great Lakes are made on channel 16 (156.80 MHz) VHF-FM (MAYDAY) for radiotelephony. For less serious situations than warrant the distress procedure, the urgency signal PAN-PAN (PAHN-PAHN, spoken three times) or the safety signal SECURITY (SAY-CURITAY, spoken three times) are used as appropriate. For complete information on emergency radio procedures, see 47 CFR 83 or NIMA Pub. 117. **(See appendix for a list of Coast Guard Stations which guard 156.80 MHz.)** Complete information on distress guards can be obtained from Coast Guard District Commanders.

(109) Distress calls indicate a vessel or aircraft is threatened by grave and imminent danger and requests immediate assistance. They have absolute priority over all other transmissions. All stations which hear a distress call must immediately cease any transmission capable of interfering with the distress traffic and shall continue to listen on the frequency used for the emission of the distress call. This call shall not be addressed to a particular station, and acknowledgement of receipt shall not be given before the distress message which follows it is sent.

(110) **Radiotelephone distress communications include the following actions:**

(111) (1) The **radiotelephone alarm signal** (if available): The signal consists of two audio tones, of different pitch, transmitted alternately; its purpose is to attract the attention of persons on radio watch or to actuate automatic alarm devices. It may only be used to announce that a distress call or message is about to follow.

(112) (2) The **distress call,** consisting of:

(113) the distress signal MAYDAY (spoken three times);

(114) the words THIS IS (spoken once);

(115) the call sign or name of the vessel in distress (spoken three times).

(116) (3) The **distress message** follows immediately and consists of:

(117) the distress signal MAYDAY;

(118) the call sign and name of the vessel in distress; particulars of its position (latitude and longitude, or true bearing and distance from a known geographical position);

(119) the nature of the distress;

(120) the kind of assistance desired;

(121) the number of persons aboard and the condition of any injured;

(122) present seaworthiness of vessel;

(123) description of the vessel (length; type; cabin; masts; power; color of hull, superstructure, trim; etc.);

(124) any other information which might facilitate the rescue, such as display of a surface-to-air identification signal or a radar reflector;

(125) your listening frequency and schedule;

(126) THIS IS (call sign and name of vessel in distress). OVER.

(127) (4) **Acknowledgement of receipt of a distress message:** If a distress message is received from a vessel which is definitely in your vicinity, immediately acknowledge receipt. If it is not in your vicinity, allow a short interval of time to elapse before acknowledging, in order to permit vessels nearer to the vessel in distress to acknowledge receipt without interference. However, in areas where reliable communications with one or more shore stations are practicable, all vessels may defer this acknowledgement for a short interval so that a shore station may acknowledge receipt first. The acknowledgement of receipt of a distress is given as follows:

(128) the call sign or name of the vessel sending the distress (spoken three times);

(129) the words THIS IS;

(130) the call sign or name of acknowledging vessel (spoken three times);

(131) The words RECEIVED MAYDAY.

(132) After the above acknowledgement, allow a momentary interval of listening to ensure that you will not interfere with another vessel better situated to render immediate assistance; if not, with the authority of the person in charge of the vessel, transmit:

(133) the word MAYDAY:

(134) the call sign and name of distressed vessel;

(135) the words THIS IS;

(136) the call sign and name of your vessel;

(137) your position (latitude and longitude, or true bearing and distance from a known geographical position);

(138) the speed you are proceeding towards, and the approximate time it will take to reach, the distressed vessel. OVER

(139) (5) **Further distress messages and other communications:** Distress communications consist of all messages relating to the immediate assistance required by the distressed vessel. Each distress communication shall be preceded by the signal MAYDAY. The vessel in distress or the station in control of distress communications may **impose silence** on any station which interferes. The procedure is: the words SEELONCE MAYDAY (Seelonce is French for silence). Silence also may be imposed by nearby mobile stations other than the vessel in distress or the station in control of distress communications. The mobile station which believes that silence is essential may request silence by the following procedure: the word SEELONCE, followed by the word DISTRESS, and its **own** call sign.

(140) (6) **Transmission of the distress procedure by a vessel or shore station not itself in distress:** A vessel or a shore station which learns that a vessel is in distress shall transmit a distress message in any of the following cases:

(141) (a) **When the vessel in distress is not itself able to transmit the distress message.**

(142) (b) When a vessel or a shore station considers that further help is necessary.

(143) (c) When, although not in a position to render assistance, it has heard a distress message that has not been acknowledged.

(144) In these cases, the transmission shall consist of:

(145) the radiotelephone alarm signal (if available);

(146) the words MAYDAY RELAY (spoken three times);

(147) the words THIS IS;

(148) the call sign and name of vessel (or shore station), spoken three times.

(149) When a vessel transmits a distress under these conditions, it shall take all necessary steps to contact the Coast Guard or a shore station which can notify the Coast Guard.

(150) (7) **Termination of distress:** When distress traffic has ceased, or when silence is no longer necessary on the frequency used for the distress traffic, the station in control shall transmit on that frequency a message to all stations as follows:

(151) the distress signal MAYDAY;

(152) the call TO ALL STATIONS, spoken three times;

(153) the words THIS IS;

(154) the call sign and name of the station sending the message;

(155) the time;

(156) the name and call sign of the vessel in distress;

(157) the words SEELONCE FEENEE (French for silence finished).

(158) **SATELLITE POSITION INDICATING RADIO BEACON (EPIRB).**–Emergency position indicating radiobeacons (EPIRBs), devices which cost from $200 to over $2000, are designed to save your life if you get into trouble by alerting rescue authorities and indicating your location. EPIRB types are described in the accompanying table.

## EPIRB Types

| Type | Frequency | Description |
|---|---|---|
| Class A | 121.5/243 MHz | Float-free, automatically-activating, detectable by aircraft and satellite. Coverage limited (see Chart). |
| Class B | 121.5/243 MHz | Manually activated version of Class A. |
| Class C | VHF ch 15/16 | Manually activated, operates on maritime channels only. Not detectable by satellite. Not authorized after 2/1/99. |
| Class S | 121.5/243 MHz | Similar to Class B, except it floats, or is an integral part of a survival craft. |
| Cat I | 406/121.5 MHz | Float-free, automatically activated EPIRB. Detectable by satellite anywhere in the world. |
| Cat II | 406/121.5 MHz | Similar to Category I, except is manually activated. |

(159) **121.5/243 MHz EPIRBs.** These are the most common and least expensive type of EPIRB, designed to be detected by overflying commercial or military aircraft. Satellites were designed to detect these EPIRBs, but are limited for the following reasons:

(160) (i) Satellite detection range is limited for these EPIRBs (satellites must be within line of sight of both the EPIRB and a ground terminal for detection to occur) (see Chart),

(161) (ii) EPIRB design and frequency congestion cause these devices to be subject to a high false alert/false alarm rate (over 99%); consequently, confirmation is required before search and rescue forces can be deployed,

(162) (iii) EPIRBs manufactured before October 1989 may have design or construction problems (e.g. some models will leak and cease operating when immersed in water), or may not be detectable by satellite.

(163) **Class C EPIRBs.** These are manually activated devices intended for pleasure craft who do not venture far offshore and for vessels on the Great Lakes. They transmit a short burst on VHF-FM channel 16 and a longer homing signal on channel 15. Their usefulness depends upon a coast station or another vessel guarding channel 16 and recognizing the brief, recurring tone as an EPIRB. Class C EPIRBs are not recognized outside of the United States.

(164) New class C EPIRB stations will not be authorized after February 1, 1995. Class C EPIRB stations installed on board vessels before February 1, 1995, may be used until February 1, 1999, and not thereafter.

(165) **406 MHz EPIRBs.**–The 406 MHz EPIRB was designed to operate with satellites. Its signal allows a satellite local user terminal to accurately locate the EPIRB (much more accurately than 121.5/243 MHz devices), and identify the vessel (the signal is encoded with the vessel's identity) anywhere in the world (there is no range limitation). These devices also include a 121.5 MHz homing signal, allowing aircraft and rescue craft to quickly find the vessel in distress. These are the only type of EPIRB which must be certified by Coast Guard approved independent laboratories before they can be sold in the United States.

(166) All 406 MHz EPIRBs must be registered with NOAA. If you change your boat, your address or your phone number, you must re-register your EPIRB with NOAA. Request 406 MHz EPIRB registration forms from; and mail or fax completed forms to:

(167) NOAA/NESDIS

(168) SARSAT Operations Division, E/SP3

(169) Federal Office Building 4

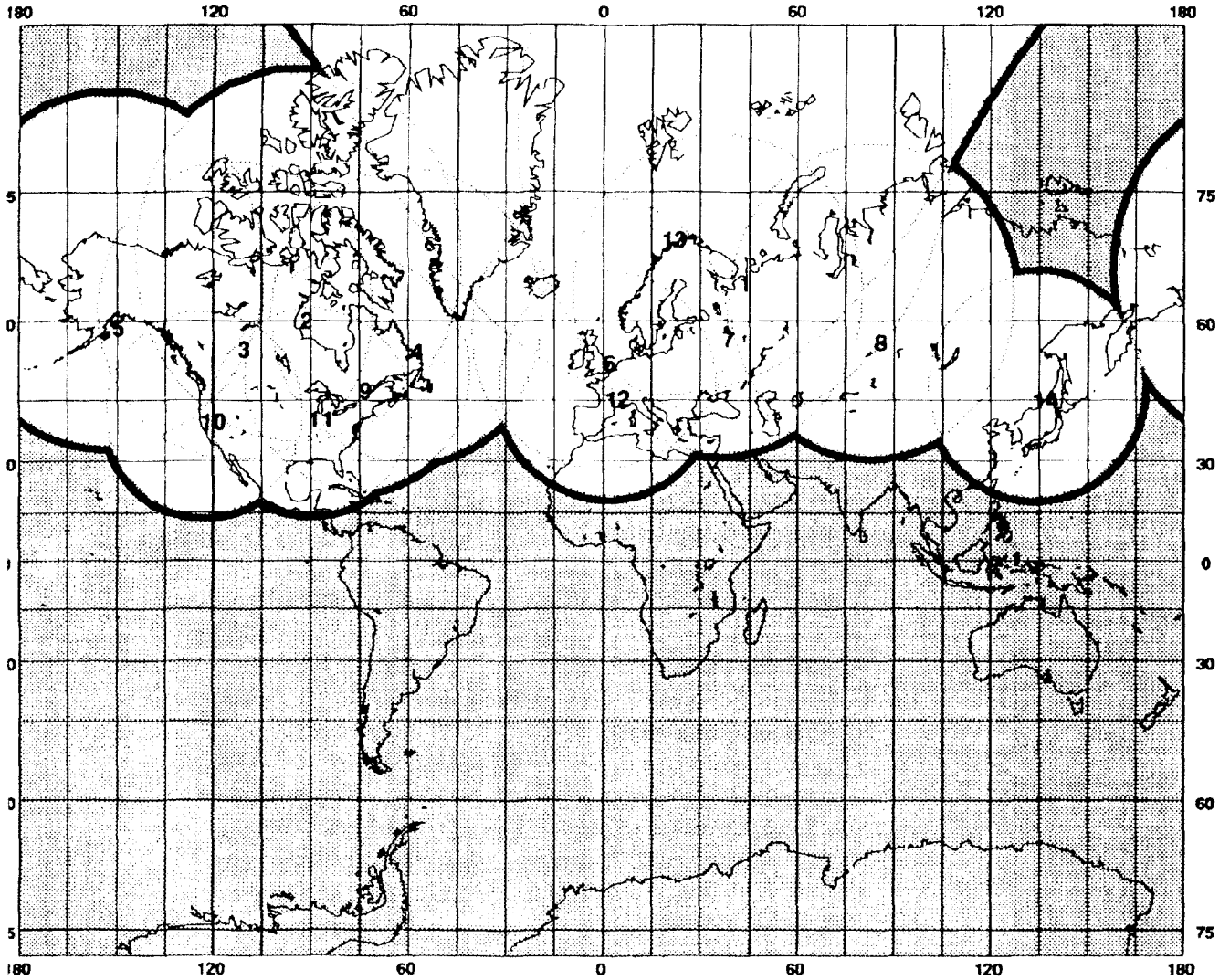
(170) Washington, DC 20233

(171) For further information on registering these EPIRBs call (301) 763-4680 or fax (301)568-8649.

(172) An automatically activated, float-free version of this EPIRB will be required on Safety of Life at Sea Convention vessels (passenger ships and ships over 300 tons, on international voyages) of any nationality by 1 August 1993. The Coast Guard requires U.S. commercial fishing vessels carry this device (by May 1990, unless they carry an Class A EPIRB), and will require the same for other U.S. commercial uninspected vessels which travel more than 3 miles offshore.

(173) The **COSPAS-SARSAT system.**–COSPAS: Space System for Search of Distress Vessels (a Russian acronym); SARSAT: Search and Rescue Satellite-Aided Tracking. COSPAS-SARSAT is an international satellite-based search and rescue system established by the U.S., Russia, Canada and France to locate emergency radio beacons transmitting on the frequencies 121.5, 243 and 406 MHz. Since its inception only a few years ago, COSPAS-SARSAT has contributed to the saving of 1240 lives (as of June 6, 1989), 554 of these mariners. The Coast Guard operates two local user terminals, satellite earth stations designed to receive EPIRB distress calls forwarded from COSPAS-SARSAT satellites, located in Kodiak, Alaska and Point Reyes, California. The Air Force operates a third terminal at Scott Air Force Base, Illinois.

(174) **Testing EPIRBs.**–The Coast Guard urges those owning EPIRBs to periodically examine them for water tightness, battery




**Notes**

**LUTs**

1 Archangelsk
2 Churchill
3 Edmonton
4 Goose Bay
5 Kodiak
6 Lasham
7 Moscow
8 Novosibirsk
9 Ottawa
10 Pt. Reyes
11 Scott AFB
12 Toulouse
13 Tromsø
14 Vladivostok

**SARSAT satellite**

| | |
|---|---|
| Altitude | 850 km |
| Elevation Angle | 5 deg |

# 1988 Satellite Visibility Area of SARSAT LUTs

**(represents approximate System coverage at 121.5 MHz; at 406 MHz, the System covers the entire globe)**

expiration date and signal presence. FCC rules allow Class A, B, and S EPIRBs to be turned on briefly (for three audio sweeps, or one second only) during the first five minutes of each hour. Signal presence can be detected by an FM radio tuned to 99.5 MHz, or an AM radio tuned to any vacant frequency and located close to an EPIRB. FCC rules allow Class C EPIRBs to be tested within the first five minutes of every hour, for not more than five seconds. Class C EPIRBs can be detected by a marine radio tuned to channel 15 or 16. 406 MHz EPIRBs can be tested through its self-test function, which is an integral part of the device.

## DISTRESS ASSISTANCE AND COORDINATION PROCEDURES

(175) **Surface ship procedures for assisting distressed surface vessels.**

(176) (1) The following immediate action should be taken by each ship on receipt of a distress message:

(177) (a) Acknowledge receipt and, if appropriate, transmit the distress message;

(178) (b) Immediately try to take D/F bearings during the transmission of the distress message and maintain a D/F watch on 2182 kHz;

(179) (c) Communicate the following information to the ship in distress:

(180) (i) identity;

(181) (ii) position;

(182) (iii) speed and estimated time of arrival (ETA);

(183) (iv) when available, true bearing of the ship in distress.

(184) (d) Maintain a continuous listening watch on the frequency used for the distress. This will normally be VHF-FM channel 16 (156.80 MHz).

(185) (e) Operate radar continuously;

(186) (f) If in the vicinity of the distress, post extra lookouts.

(187) (2) The following action should be taken when proceeding to the area of distress:

(188) (a) Plot the position, course, speed, and ETA of other assisting ships;

(189) (b) Know the communication equipment with which other ships are fitted. This information may be obtained from the International Telecommunication Union's List of Ship Stations;

(190) (c) Attempt to construct an accurate "picture" of the circumstances attending the casualty. The important information needed is included under Distress Signals and Communication Procedures, this chapter. Should the ship in distress fail to transmit this information, a ship proceeding to assist should request what information is needed.

(191) (3) The following on-board preparation while proceeding to the distress area should be considered:

(192) (a) A rope (guest warp) running from bow to quarter at the waterline on each side and secured by lizards to the ship's side to assist boats and rafts to secure alongside;

(193) (b) A derrick rigged ready for hoisting on each side of the ship with a platform cargo sling, or rope net, secured to the runner to assist the speedy recovery of exhausted or injured survivors in the water;

(194) (c) Heaving lines, ladders, and scramble net placed ready for use along both sides of the ship on the lowest open deck and possibly crew members suitably equipped to enter the water and assist survivors;

(195) (d) A ship's liferaft made ready for possible use as a boarding station;

(196) (e) Preparations to receive survivors who require medical assistance including the provision of stretchers;

(197) (f) When own lifeboat is to be launched, any means to provide communications between it and the parent ship will prove to be of very great help;

(198) (g) A line throwing appliance with a light line and a heavy rope, ready to be used for making connection either with the ship in distress or with survival craft.

(199) **Aircraft procedures for directing surface craft to scene of distress incident.**–The following procedures performed in sequence by an aircraft mean that the aircraft is directing a surface craft toward the scene of a distress incident,

(200) (a) Circling the surface craft at least once.

(201) (b) Crossing the projected course of the surface craft close ahead at low altitude, rocking the wings, opening and closing the throttle, or changing the propeller pitch.

(202) (c) Heading in the direction in which the surface craft is to be directed. The surface craft should acknowledge the signal by changing course and following the aircraft. If, for any reason, it is impossible to follow, the surface craft should hoist the international code flag NOVEMBER, or use any other signaling means available to indicate this.

(203) The following procedures performed by an aircraft mean that the assistance of the surface craft is no longer required:

(204) (a) Crossing the wake of the surface craft close astern at a low altitude, rocking the wings, opening and closing the throttle or changing the propeller pitch.

(205) Since modern jet-engined aircraft cannot make the characteristic sound associated with opening and closing the throttle, or changing propeller pitch, ships should be alert to respond to the signals without the sounds, when jets or turboprop aircraft are involved.

(206) **Surface ship procedures for assisting aircraft in distress.**–1. When an aircraft transmits a distress message by radio, the first transmission is generally made on the designated air/ground en route frequency in use at the time between the aircraft and aeronautical station. The aircraft may change to another frequency, possibly another en route frequency or the aeronautical emergency frequencies of 121.50 MHz or 243 MHz. In an emergency, it may use any other available frequency to establish contact with any land, mobile, or direction-finding station.

(207) 2. There is liaison between Coast Radio Stations aeronautical units, and land-based search and rescue organizations. Merchant ships will ordinarily be informed of aircraft casualties at sea by broadcast messages from Coast Radio Stations, made on the international distress frequency of 156.80 MHz (VHF-FM channel 16). Ships may, however, become aware of the casualty by receiving a message from the aircraft in distress or a SAR aircraft.

(208) 3. For the purpose of emergency communications with aircraft, special attention is called to the possibility of conducting direct communications on 2182 kHz, if both ship and aircraft are so equipped.

(209) 4. An aircraft in distress will use any means at its disposal to attract attention, make known its position, and obtain help, including some of the signals prescribed by the applicable Navigation Rules.

(210) 5. Aircraft usually sink quickly (i.e., within a few minutes). Every endeavor will be made to give ships an accurate position of an aircraft which desires to ditch. When given such a position, a ship should at once consult any other ships in the vicinity on the best procedure to be adopted. The ship going to the rescue should answer the station sending the broadcast and give her identity, position, and intended action.

(211) 6. If a ship should receive a distress message direct from an aircraft, she should act as indicated in the immediately preceding paragraph and also relay the message to the nearest Coast Radio Station. Moreover, a ship which has received a distress message direct from an aircraft and is going to the rescue should take a bearing on the transmission and inform the Coast Radio Station and other ships in the vicinity of the call sign of the distressed aircraft and the time at which the distress message was received, followed by the bearing and time at which the signal ceased.

(212) 7. When an aircraft decides to ditch in the vicinity of a ship, the ship should:

(213) (a) Transmit homing bearings to the aircraft, or (if so required) transmit signals enabling the aircraft to take its own bearings.

(214) (b) By day, make black smoke.

(215) (c) By night, direct a searchlight vertically and turn on all deck lights. Care must be taken not to direct a searchlight toward the aircraft, which might dazzle the pilot.

(216) 8. Ditching an aircraft is difficult and dangerous. A ship which knows that an aircraft intends to ditch should be prepared to give the pilot the following information:

(217) (a) Wind direction and force.

(218) (b) Direction, height, and length of primary and secondary swell systems.

(219) (c) Other pertinent weather information.

(220) The pilot of an aircraft will choose his own ditching heading. If this is known by the ship, she should set course parallel to the ditching heading. Otherwise the ship should set course parallel to the main swell system and into the wind component, if any.

(221) 9. A land plane may break up immediately on striking the water, and liferafts may be damaged. The ship, should, therefore, have a lifeboat ready for launching, and if possible, boarding nets should be lowered from the ship and heaving lines made ready in the ship and the lifeboat. Survivors of the aircraft may have bright colored lifejackets and location aids.

(222) 10. The method of recovering survivors must be left to the judgment of the master of the ship carrying out the rescue operation.

(223) 11. It should be borne in mind that military aircraft are often fitted with ejection seat mechanisms. Normally, their aircrew will use their ejection seats, rather than ditch. Should such an aircraft ditch, rather than the aircrew bail out, and it becomes necessary to remove them from their ejection seats while still in the aircraft, care should be taken to avoid triggering off the seat mechanisms. The activating handles are invariably indicated by red and or black/yellow coloring.

(224) 12. A survivor from an aircraft casualty who is recovered may be able to give information which will assist in the rescue of other survivors. Masters are therefore asked to put the following questions to survivors and to communicate the answers to a Coast Radio Station. They should also give the position of the rescuing ship and the time when the survivors were recovered.

(225) (a) What was the time and date of the casualty?

(226) (b) Did you bail out or was the aircraft ditched?

(227) (c) If you bailed out, at what altitude?

(228) (d) How many others did you see leave the aircraft by parachute?

(229) (e) How many ditched with the aircraft?

(230) (f) How many did you see leave the aircraft after ditching?

(231) (g) How many survivors did you see in the water?

(232) (h) What flotation gear had they?

(233) (i) What was the total number of persons aboard the aircraft prior to the accident?

(234) (j) What caused the emergency?

(235) **Helicopter evacuation** of personnel.–Helicopter evacuation, usually performed by the Coast Guard, is a hazardous operation to the patient and to the flight crew, and should only be attempted in event of very serious illness or injury. Provide the doctor on shore with all the information you can concerning the patient, including age, current condition, pulse, blood pressure, respiration rate, and any known medical history, so that an intelligent evaluation can be made concerning the need for evacuation. Most rescue helicopters can proceed less than 150 miles offshore (a few new helicopters can travel 250 to 300 miles out to sea), dependent on weather conditions and other variables. If an evacuation is necessary, the vessel must be prepared to proceed within range of the helicopter, and should be familiar with the preparations which are necessary prior to and after its arrival.

(236) **When requesting helicopter assistance:**

(237) (1) Give the accurate position, time, speed, course, weather conditions, sea conditions, wind direction and velocity, type of vessel, and voice and CW frequency for your ship.

(238) (2) If not already provided, give complete medical information including whether or not the patient is ambulatory.

(239) (3) If you are beyond helicopter range, advise your diversion intentions so that a rendezvous point may be selected.

(240) (4) If there are changes to any items reported earlier, advise the rescue agency immediately. Should the patient die before the arrival of the helicopter, be sure to advise those assisting you.

(241) **Preparations prior to the arrival of the helicopter:**

(242) (1) Provide continuous radio guard on VHF-FM channel 16 (156.80 MHz).

(243) (2) Select and clear the most suitable hoist area, preferably aft on the vessel with a minimum of 50 feet (15.2 meters) radius of clear deck. This must include the securing of loose gear, awnings, and antenna wires. Trice up running rigging and booms. If hoist is aft, lower the flag staff.

(244) (3) If the hoist is to take place at night, light the pickup areas as well as possible. Be sure you do not shine any lights on the helicopter, so that the pilot is not blinded. If there are any obstructions in the vicinity, put a light on them so the pilot will be aware of their positions.

(245) (4) Point searchlights vertically to aid the flight crew in locating the ship and turn them off when the helicopter is on the scene.

(246) (5) Be sure to advise the helicopter of the location of the pickup area on the ship before the helicopter arrives, so that the pilot may make his approach to aft, amidships, or forward, as required.

(247) (6) There will be a high noise level under the helicopter, so voice communications on deck are almost impossible. Arrange a set of hand signals among the crew who will assist.

(248) **Hoist operations:**

(249) (1) If possible, have the patient moved to a position as close to the hoist area as his condition will permit-**time is important.**

(250) (2) Normally, if a litter (stretcher) is required, it will be necessary to move the patient to the special litter which will be lowered by the helicopter. Be prepared to do this as quickly as possible. Be sure the patient is strapped in, face up, and with a life jacket on (if his condition will permit).

(251) (3) Be sure that the patient is tagged to indicate what medication, if any, was administered to him and when it was administered.

(252) (4) Have patient's medical record and necessary papers in an envelope or package ready for transfer with the patient.

(253) (5) Again, if the patient's condition permits, be sure he is wearing a life jacket.

(254) (6) Change the vessel's course to permit the ship to ride as easily as possible with the wind on the bow, preferably on the port bow. Try to choose a course to keep the stack gases clear of the hoist area. Once established, maintain course and speed.

(255) (7) Reduce speed to ease ship's motion, but maintain steerageway.

(256) (8) If you do not have radio contact with the helicopter, when you are in all respects ready for the hoist, signal the helicopter in with a "come on" with your hand, or at night by flashlight signals.

(257) (9) **Allow basket or stretcher to touch deck prior to handling to avoid static shock.**

(258) (10) If a trail line is dropped by the helicopter, guide the basket or stretcher to the deck with the line; keep the line free at all times. This line will not cause shock.

(259) (11) Place the patient in basket, sitting with his hands clear of the sides, or in the litter, as described above. Signal the helicopter hoist operator when ready for the hoist. Patient should signal by a nodding of the head if he is able. Deck personnel give thumbs up.

(260) (12) If it is necessary to take the litter away from the hoist point, unhook the hoist cable and keep it free for the helicopter to haul in. **Do not secure cable or tail line to the vessel or attempt to move stretcher without unhooking.**

(261) (13) When patient is strapped into the stretcher, signal the helicopter to lower the cable, attach cable to stretcher sling (bridle), then signal the hoist operator when the patient is ready to hoist. Steady the stretcher so it will not swing or turn.

(262) (14) If a trail line is attached to the basket or stretcher, use it to steady the patient as he is hoisted. Keep your feet clear of the line, and keep the line from becoming entangled.

(263) **Medical advice and/or evacuation.**–In the event a master of a vessel requires medical advice and/or there is a potential of evacuation the following should be volunteered by master:

(264) Vessel's name and call sign.

(265) Vessel's position and time at position.

(266) Vessel's course, speed and next port and estimated time of arrival (ETA).

(267) Patient's name, nationality, age, race and sex.

(268) Patient's respiration, pulse and temperature.

(269) Patient's symptoms and nature of illness.

(270) Any known history of similar illness.

(271) Location and type of pain.

(272) Medical supplies carried on board vessel.

(273) Medication given to patient.

(274) Weather.

(275) Communication schedule and frequency.

(276) **Coast Guard droppable, floatable pumps.**–The Coast Guard often provides vessels in distress with emergency pumps by either making parachute drops, by lowering on helicopter hoist, or by delivering by vessel. The most commonly used type of pump comes complete in a sealed aluminum drum about half the size of a 50-gallon oil drum. One single lever on top opens it up. Don't be smoking as there may be gas fumes inside the can. The pump will draw about 90 gallons per minute. There should be a waterproof flashlight on top of the pump for night use. Operating instructions are provided inside the pump container.

(277) **Preparations for being towed by Coast Guard:**

(278) (1) Clear the forecastle area as well as you can.

(279) (2) If a line-throwing gun is used, keep everyone out of the way until line clears the boat. The Coast Guard vessel will blow a police whistle or otherwise warn you before firing.

(280) (3) Have material ready for chafing gear.

(281) **Radar reflectors on small craft.**–Operators of disabled wooden or fiberglass craft and persons adrift in rubber rafts or boats that are, or may consider themselves to be, the object of a search, should hoist on a halyard or otherwise place aloft as high as possible any irregularly shaped metallic object that would assist their detection by radar. The more irregular the shape, the better will be the radar reflective quality. Coast Guard cutters and aircraft are radar equipped and thus are able to continue searching in darkness and during other periods of low visibility. To assist in identification during periods of low visibility, shine spotlights straight up, being careful not to blind the crew when aircraft are involved. It is advisable for coastal fishing boats, yachts, and other small craft to have efficient radar reflectors permanently installed aboard the vessel.

(282) **Filing Cruising schedules.**–Small-craft operators should prepare a cruising plan before starting on extended trips and leave it ashore with a yacht club, marina, friend, or relative. It is advisable to use a checking-in procedure by telephone for each point specified in the cruising plan. Such a trip schedule is vital for determining if a boat is overdue and will assist materially in locating a missing craft in the event search and rescue operations become necessary.

(283) **Search and Rescue Telephone Number.**–The United States Coast Guard has established a toll-free search and rescue telephone number for the Great Lakes. The number is intended for use when the telephone number of the nearest Coast Guard station is unknown, or when that station cannot be contacted. The toll-free number should not be used without first attempting to contact the nearest Coast Guard station. In all Great Lakes States, except Ohio, the telephone number is 800-321-4400; in Ohio the telephone number is 800-362-1033. These numbers are to be used for search and rescue only.

## RADIO NAVIGATION WARNINGS AND WEATHER

(284) Marine radio warnings and weather are disseminated by many sources and through several types of transmissions. Morse code radiotelegraph broadcasts of navigational warnings and other advisories are not described, since these transmissions are normally copied only by professional radio operators. U.S. Coast Guard NAVTEX, high-frequency (HF) narrow-band direct printing (radio telex), HF radiofacsimile, and radiotelephone broadcasts of maritime safety information are summarized here. (For complete information on radio warnings and weather see NIMA Pub. 117 and the NWS internet site, **Marine Product Dissemination Information**, (http://www.nws.noaa.gov/om/marine/home.htm).)

(285) **Frequency units.–Hertz (Hz),** a unit equal to one cycle per second,has been generally adopted for radio frequencies; accordingly, frequencies formerly given in the Coast Pilots in kilocycles (kc) and megacycles (mc) are now stated in **kilohertz (kHz)** and **Megahertz (MHz),** respectively.

(286) **Coast Guard radio stations.**–Urgent, safety, and scheduled marine information broadcasts are made by Coast Guard radio stations. In general, these broadcasts provide information

vital to vessels operating in the approaches and coastal waters of the United States including the Great Lakes, Puerto Rico, and U.S. Virgin Islands.

(287) **Urgent and safety radiotelephone broadcasts** include important Notice to Mariners items, storm warnings, and other vital marine information. U.S. Coast Guard stations which make scheduled broadcasts issue **safety broadcasts** upon receipt and on the next scheduled broadcast. Stations which do not make scheduled broadcasts issue safety broadcasts upon receipt and at intervals of 3 hours for 24 hours. Safety broadcasts are preceded by the safety signal SECURITY (SAY-CURITAY, spoken three times). After the preliminary signal on VHF-FM channel 16, the station may announce shifting to working frequency VHF-FM channel 22A.

(288) Scheduled radiotelephone broadcasts include routine weather, small-craft advisories, storm warnings, navigational information, and other advisories. Short-range broadcasts are made on **2670 khz** and/or **VHF-FM channel 22A,** following a preliminary call on **2182 kHz** and/or **VHF-FM channel 16.** (See appendix for a list of stations and their broadcast frequencies and times for the area covered by this Coast Pilot.)

(289) Weather information is not normally broadcast by the Coast Guard on VHF-FM channel 22A in areas where NOAA Weather Radio service is available. See note below regarding VHF-FM channel 22A.

(290) HF single-sideband broadcasts of high seas weather information is available on the (carrier) frequencies 4428.7, 6506.4, 8765.4, 13113.2, and 17307.3 kHz from Portsmouth, VA and San Francisco, CA.

(291) Narrow-band direct printing (radio telex or sitor) broadcasts of NAVAREA and other navigational warnings are transmitted on the following assigned frequencies:

(292) Atlantic ice reports: 5320, 8502, and 12750 kHz.

(293) Other Atlantic warnings: 8490, 16968.8 kHz.

(294) Pacific: 8710.5, 8714.5, 8718, 13077, 13084,5, 17203, 22567, and 22574.5 kHz.

(295) HF radiofacsimile broadcasts of weather and ice charts are made on the following frequencies:

(296) Atlantic: 3242, 7530, 8502, (ice only), 12750 (ice only) khz.

(297) Pacific: 4298 (Kodiak), 4336, 8459 (Kodiak), 8682, 12730, 17151.2 kHz.

(298) **National Standard Abbreviations for Broadcasts.**–A listing of Standard Abbreviations for Textual Maritime Safety Broadcasts is contained in tables T-28 through T-30. These abbreviations were jointly approved by the U.S. Coast Guard, National Weather Service, National Imagery and Mapping Agency, and the Radio Technical Commission for Maritime Services. In addition to appearing in radio broadcasts of the U.S. Coast Guard and National Weather Service, they appear in Notices to Mariners of the U.S. Coast Guard and National Imagery and Mapping Agency, and in NAVTEX.

(299) Urgent marine information broadcasts are also made on VHF-FM channel 16 by certain commercial radiotelephone stations on the Great Lakes. (See appendix for station location and area of coverage.)

(300) **Warning Regarding Coast Guard VHF-FM Channel 22A Broadcasts.**–The Coast Guard broadcasts urgent and routine maritime safety information to ships on channel 22A (157.10 MHz), the ship station transmit frequency portion of channel 22, of Appendix 18 of the International Telecommunications Union (ITU) Radio Regulations. This simplex use of channel 22A is not compatible with the international duplex arrangement of the channel (coast transmit 161.70 MHz, ship transmit 157.10 MHz). As a result, many foreign flag vessels having radios tuned to the international channel 22 can not receive these maritime safety broadcasts. A 1987 Coast Guard survey of foreign vessels in U.S. waters indicated that half of foreign vessels in U.S. waters did not have equipment on board capable of receiving channel 22A broadcasts.

(301) Operators of vessels which transit U.S. waters and who do not have VHF-FM radios tunable to USA channel 22A are urged to either obtain the necessary equipment, to monitor the radiotelephone frequency 2182 kHz and tune to 2670 kHz when a broadcast is announced, or to carry a NAVTEX receiver.

(302) **NAVTEX Marine Information Broadcasts.**–**NAVTEX** is an international system used in the United States to broadcast printed copies of Coast Guard district notices to mariners, distress notices, weather forecasts and warnings, ice warnings, and Gulf Stream location (where applicable), and radionavigation information to all types of ships. NAVTEX consists of a small, low-coast and self-contained "smart" printing radio receiver installed in the pilot house of a ship or boat. The receiver checks each incoming message to see if it has been received during an earlier transmission, or if it is of a category of no interest to the ship's master. If it is a new and wanted message, it is printed on a roll of adding-machine size paper; if not, the message is ignored. The ship's master can, at his convenience, read the latest notices he needs to know. A new ship coming into the area will receive many previously-broadcast messages for the first time; ships already in the area which had already received the message will not receive it again. NAVTEX can be received either by a dedicated receiver, or by any narrow- band direct printing (radio telex) receiver operating in the forward error correcting (FEC) mode, tuned to 518 kHz.

(303) The accompanying chart shows NAVTEX predicted coverage areas for the U.S. east and west coasts. The propagation predictions were based upon a 90% probability of reception during an average season and time of atmospheric radio noise, with a received character error rate of 1 in 1,000. The Coast Guard operates NAVTEX from stations in Boston (NMF), Portsmouth, VA (NMN), Miami (NMA), New Orleans (NMG), San Juan, PR (NMR), Long Beach, CA, San Francisco (NMC), Astoria, OR Kodiak, AK (NOJ), Honolulu (NMO) and Guam (NRV). The Canadian Coast Guard also broadcasts NAVTEX information from Sydney, Nova Scotia.

(304) As of January 1988, 43 NAVTEX stations in 19 countries were in operation worldwide, and 7 other countries indicated they might soon begin operating NAVTEX.

(305) Broadcasts are planned internationally. Mandatory carriage of NAVTEX receivers is required for Safety of Life at Sea (SOLAS) Convention regulated vessels (merchant vessels greater than 300 gross tons and passenger vessels on international voyages) after 1993.

(306) Questions and comments concerning the NAVTEX service in the United States are solicited. Correspondence should be addressed to:

(307) Commandant (G-TTS-3/63)

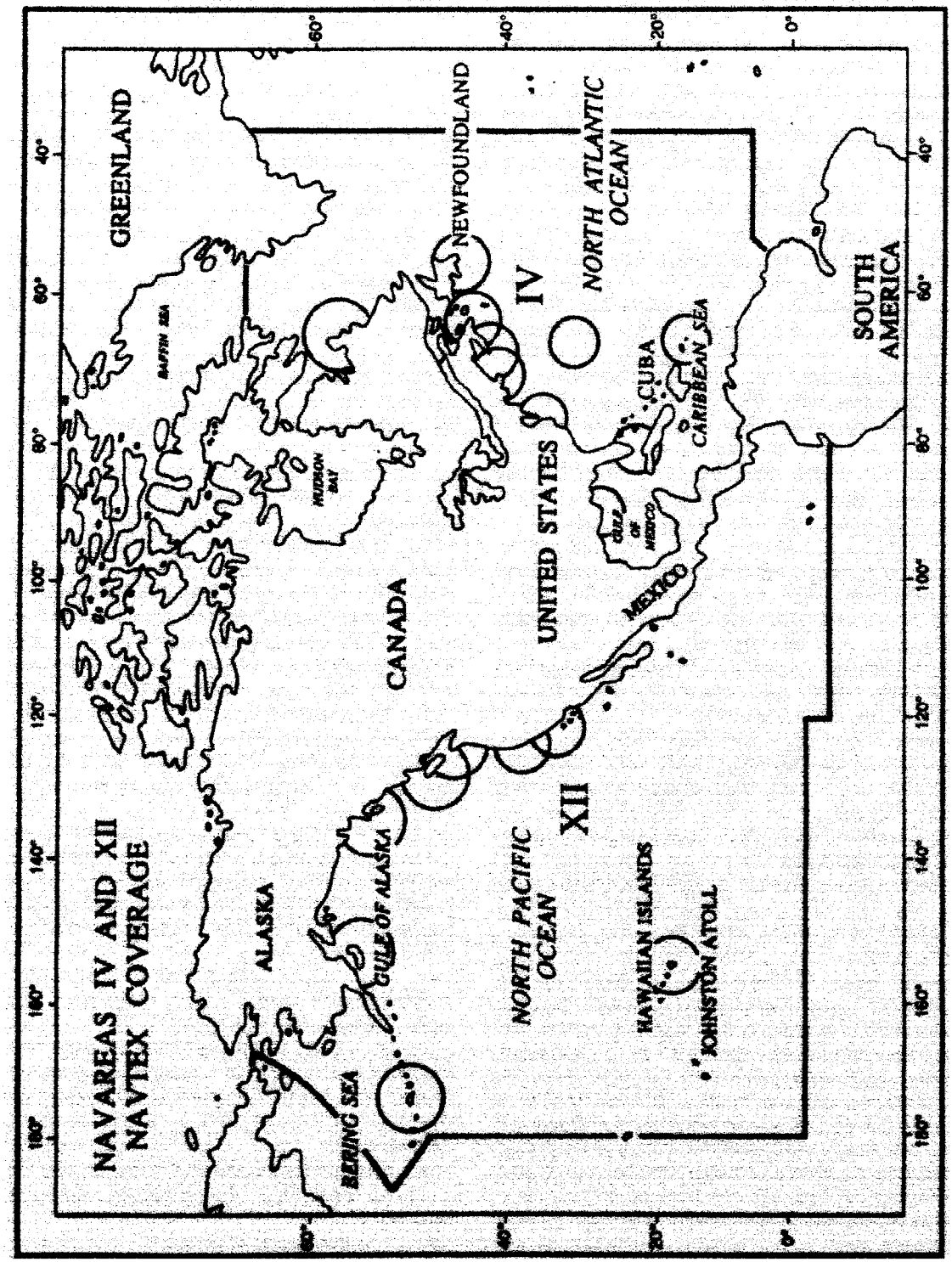
(308) United States Coast Guard

(309) Washington, DC 20593-0001

(310) Telex: 89-2427 COMDT COGARD Washington, D.C.

(311) **National Weather Service forecasts and warnings** are issued at least every 6 hours, more frequently if necessary, by National Weather Service Forecast Offices. (See appendix for addresses.)

(312) **Lake Weather Broadcasts (LAWEB)** are plain language broadcasts giving current weather for all the Great Lakes and the


NAVAREAS IV AND XII
NAVTEX COVERAGE
GREENLAND
BAFFIN SEA
HUDSON BAY
CANADA
ALASKA
GULF OF ALASKA
BERING SEA
NEWFOUNDLAND
IV
NORTH ATLANTIC OCEAN
UNITED STATES
CUBA
CARIBBEAN SEA
GULF OF MEXICO
MEXICO
SOUTH AMERICA
NORTH PACIFIC OCEAN
XII
HAWAIIAN ISLANDS
JOHNSTON ATOLL
-60°
-40°
-20°
0°
40°
60°
80°
100°
120°
140°
160°
180°

St. Lawrence River above St. Regis. The broadcasts are prepared and issued by NWS Forecast Office, Cleveland, Ohio. LAWEBs are broadcast by WLC, Rogers City, Mich.

(313) LAWEBs are also broadcast by the Canadian Coast Guard. (See Canadian Sailing Directions.)

(314) **Marine Forecasts (MAFOR)** are coded weather forecasts which are preceded by a plain language description of the current weather map. These are issued by NWS Forecast Offices as follows: WSFO Buffalo for Lake Ontario and the St. Lawrence River above St. Regis; WSFO Cleveland for Lake Erie; WSFO Anne Arbor for Lake Huron; and WSFO Chicago for Lake Michigan and Lake Superior. MAFORs are broadcast by WLC, Rogers City, Mich.

(315) **NOAA Weather Radio** provides continuous broadcasts of the latest weather information directly from NWS offices. In addition to general weather information, marine weather is provided by stations along the sea coasts and the Great Lakes. During severe weather, NWS forecasters can interrupt the regular broadcasts and substitute special warning messages. The forecasters can also activate specially designed warning receivers. These receivers either sound an alarm alerting the listener to the forthcoming broadcast or, when operated in a muted mode, automatically turn on so that the warning message is heard.

(316) NOAA Weather Radio taped messages are repeated every 4 to 6 minutes and are routinely revised every 1 to 3 hours, or more frequently if necessary. The stations operate 24 hours daily. The broadcasts are made on seven VHF-FM frequencies, 162.40, to 162.55 MHz. The 162.475 MHz frequency is only used in special cases where needed to avoid channel interference. A number of manufacturers offer special weather radios to operate on these frequencies, with or without emergency warning alarm, and many AM/FM radios on the market now offer the "weather band" as an added feature. The broadcasts can usually be heard as far as 40 miles from the antenna site, sometimes more. The effective range depends on many factors, including the height of the broadcast antenna, terrain, quality of the receiver, and the type of receiving antenna. As a general rule, listeners close to or perhaps beyond the 40 mile range should have a good quality receiver system to get reliable reception. (See the appendix for a list of these stations in the area covered by this Coast Pilot.)

(317) **Marine Weather Services Charts** (MSC), published by the National Weather Service, list stations, frequencies, and schedules of broadcasts of Great Lakes weather forecasts and warnings. Chart MSC-11 covers Lakes Superior and Michigan, and chart MSC-12 covers Lakes Huron, Erie, and Ontario. The charts are available from National Ocean Service, Distribution Division (N/ACC3). (See appendix for address.)

(318) **Commercial radiotelephone coast stations.**–Broadcasts of coastal weather and warnings are made by some commercial radiotelephone coast stations (marine operators) on the normal transmitting frequencies of the stations. Vessels with suitable receivers and desiring this service may determine the frequencies and schedules of these broadcasts from their local stations.

(319) **Local broadcast-band radio stations.**–Many local radio stations in the standard AM and FM broadcast band give local marine weather forecasts from NWS on a regular schedule.

(320) **Reports from ships.**–The master of every U.S. ship equipped with radio transmitting apparatus, on meeting with a tropical cyclone, dangerous ice, subfreezing air temperatures with gale force winds causing severe ice accretion on superstructures, derelict, or any other direct danger to navigation, is required to cause to be transmitted a report of these dangers to ships in the vicinity and to the appropriate Government agencies.

(321) Many Great Lakes vessels are equipped to take and report weather observations. These are used by NWS to prepare forecasts and are incorporated into LAWEBs. In addition to vessels, these reports are also received from automated weather stations, Coast Guard stations, and other shore facilities.

(322) **Time Signals.**–The **National Institute of Standards and Technology (NIST)** broadcasts time signals continuously, day and night, from its radio stations **WWV,** near Fort Collins, Colorado, (40°49′49″N., 105°02′27″W.) on frequencies of 2.5, 5, 10, 15, and 20 MHz, and **WWVH,** Kekaha, Kauai, Hawaii (21°59′26″N., 159°46′00″W.) on frequencies 2.5, 5, 10, and 15 MHz. Services include time announcements, standard time intervals, standard audio frequencies, geophysical alerts, BCD (binary coded decimal) time code, UT1 time corrections, and high seas storm information.

(323) Time announcements are made every minute, commencing at 15 seconds before the minute by a female voice and at 7½ seconds before the minute by a male voice, from WWVH and WWV, respectively. The time given is in Coordinated Universal Time (UTC) and referred to the time at Greenwich, England, i.e., Greenwich Mean Time.

(324) **NIST Time and Frequency Dissemination Services, Special Publication 432**, gives a detailed description of the time and frequency dissemination services of the National Institute of Standards and Technology. Single copies may be obtained upon request from the National Institute of Standards and Technology, Time and Frequency Division, Boulder, Colo. 80303. Quantities may be obtained from the Government Printing Office (see appendix for address).

(325) **Canadian time signals** are broadcast by radio station CHU, Ottawa, Ont. (45°17′47″N., 75°45′22″W.), continuously on radio frequencies of 3330, 7335, and 14670 kHz. A tone pulse denotes each second. Omission of the 29th pulse identifies the half minute, and the 51st to 59th pulses are omitted to allow for a voice announcement of the minute. The zero pulse of each minute is 0.5 second long, except that the hour is identified by a 1-second pulse followed by 12 seconds of silence.

## NAUTICAL CHARTS

(326) **Reporting chart deficiencies.**–Users are requested to report all significant observed discrepancies in and desirable additions to NOS nautical charts, including depth information in privately maintained channels and basins; obstructions, wrecks, and other dangers; new landmarks or the nonexistence or relocation of charted ones; uncharted fixed private aids to navigation; and deletions or additions of small-craft facilities. All such reports should be sent to

(327) Chief
(328) Marine Chart Division (N/CS2)
(329) National Ocean Service, NOAA
(330) 1315 East-West Highway, Station 7317
(331) Silver Spring, MD 20910-3282.

(332) **Chart symbols and abbreviations.**–The standard symbols and abbreviations approved for use on all regular nautical charts published by the National Imagery and Mapping Agency and NOS are contained in **Chart No. 1,** United States of America **Nautical Chart Symbols and Abbreviations.** This publication is available from NOS Distribution Division (see Sales Information, appendix).

(333) On certain foreign charts reproduced by the United States, and on foreign charts generally, the symbols and abbreviations

used may differ from U.S. approved standards. It is, therefore, recommended that navigators who acquire and use foreign charts and reproductions procure the symbol sheet or Chart No. 1 produced by the same foreign agency. The publication **Symbols and Abbreviations Used on Canadian Nautical Charts** is available from the Canadian Hydrographic Chart Distribution Office. (See appendix for address.)

(334) The mariner is warned that the buoyage systems, shapes, and colors used by other countries often have a different significance than the U.S. system.

(335) **Chart Datum, Great Lakes System.**–The water levels of the individual Great Lakes and their connecting waters are constantly changing. To facilitate the charting of depths and vertical heights, it became necessary to adopt a standard or fixed reference level for each lake in the Great Lakes system. Commencing in 1953, representatives from the Chief of Engineers, U.S. Army Corps of Engineers; Great Lakes Division Engineer, U.S. Army Corps of Engineers; U.S. Lake Survey (since incorporated into National Ocean Service), U.S. Army Corps of Engineers; Canadian Department of Resources and Development; Canadian Department of Mines and Technical Surveys; and Canadian Department of Transport, met to establish a basis for the development and acceptance of data to standards common to all concerned. The representatives agreed that the Great Lakes-St. Lawrence River system should be considered as a unit with datum and reference surfaces based on mean water at the outlet of the system in the St. Lawrence River.

(336) As a result, the first International Great Lakes Datum, had as its common elevation reference, or zero point, mean water level at Pointe-au-Pere (Father Point) (48°31′09″N., 68°28′25″W.), Quebec, at the mouth of the St. Lawrence River. This was **International Great Lakes Datum 1955 (IGLD 1955).** This was based on measurements at Pointe-au-Pere over the period 1941 through 1956.

(337) Effective January 1992, the current International Great Lakes Datum has its common elevation reference, or zero point, at mean water level at Rimouski (48°28′44″N., 68°30′55″W.), Quebec, slightly upstream from Pointe-au-Pere. This is **International Great Lakes Datum 1985 (IGLD1985).** This was based on measurements at Pointe-au-Pere/Rimouski over the period 1982-1988. IGLD 1985 was developed by representatives of National Ocean Service, U.S. Army Corps of Engineers, Canadian Hydrographic Service, Canadian Department of Fisheries and Oceans, Geodetic Survey of Canada, and Canadian Department of Energy, Mines and Resources.

(338) In turn, each individual lake has a fixed reference level based on the current IGLD. These reference levels are called **Low Water Datum** (LWD) and are the chart datum for the particular lake or river. The values of Low Water Datum were chosen so that during the navigation season the actual water levels in each lake would be above the datum most of the time. Depths, clearances under bridges and overhead cables, and heights of terrestial objects in the Great Lakes are all measured from chart datum, Low Water Datum for the particular body of water. Note that this is different from coastal waters, where depths and heights are measured from separate datums based upon tidal fluctuations.

(339) Heights of LWD of individual lakes of the Great Lakes based on IGLD 1985 are as shown in the accompanying table.

## Heights of LWD

| Waterway | Feet | Meters |
|---|---|---|
| Lake Ontario | 243.3 | 74.2 |
| Lake Erie | 569.2 | 173.5 |
| Lake St. Clair | 572.3 | 174.4 |
| Lake Huron | 577.5 | 176.0 |
| Lake Michigan | 577.5 | 176.0 |
| Lake Superior | 601.1 | 183.2 |

(340) **Horizontal Datum.**–Nautical charts presently are constructed based on one of a number of horizontal datums which are adopted to best represent individual regions around the world. Horizontal datum, horizontal geodetic datum, and horizontal control datum are synonymous.

(341) The exact placement of lines of latitude and longitude on a nautical chart is dependent on the referenced horizontal datum. Charts of the United States are currently referenced to datums such as the North American Datum of 1927 (NAD 27), Puerto Rican Datum, Old Hawaiian Datum, and others. Through the use of satellites and other modern surveying techniques, it is now possible to establish global reference systems.

(342) **North American Datum of 1983** (NAD 83) is the new geodetic reference system (horizontal datum) for the United States and Canada. NAD 83 replaces the various datums used in the past on NOS charts, except charts of Hawaii, and other Pacific Ocean islands, which will be compiled on **World Geodetic System 1984 (WGS 84).** WGS 84 is equivalent to the NAD 83 for charting purposes.

(343) The parameters of the ellipsoid of reference used with NAD 83 are very close to those used for WGS 84. The ellipsoid used for NAD 83, **Geodetic Reference System 1980 (GRS 80),** is earth centered or geocentric as opposed to the nongeocentric ellipsoids previously employed. This means that the center of the ellipsoid coincides with the center of mass of the earth.

(344) Many NOS charts have been converted to NAD 83. The NOS publication **Dates of Latest Editions**, published quarterly indicates, to date, which NOS charts have been published to NAD 83.

(345) What does this change in datum mean to the mariner? It means that during the period of conversion, some charts will be referenced to the new NAD 83 datum, while others will still be referenced to the old former datum. Charted features will remain unaffected in their relationship with the surrounding area. Therefore, when comparing charts of the same area, referenced to different horizontal datums, no changes to charted features will be noticed since all features shift by approximately the same amount. The apparent difference will be the shift of the latitude and longitude grid in relation to the charted features. As a result, the geographic positions (latitude and longitude) of all charted features will change.

(346) Each NOS chart that is published carries a standard horizontal datum note identifying the datum used on that chart.

(347) **Case I:** In addition to the standard horizontal datum note, all charts that have been converted to NAD 83 will carry an additional Horizontal Datum Note, similar to the one below, that will inform the mariner if any correction must be made to the latitude and longitude when transferring geographic positions from the previous charted datum to NAD 83.

(348) **Sample Horizontal Datum Note** (on chart 13272, Boston Inner Harbor):

(349) **"HORIZONTAL DATUM**

(350) The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83), which for charting purposes is considered equivalent to the World Geodetic System 1984 (WGS 84). Geographic positions referred to the North American Datum of 1927 must be corrected an average of 0.351″ northward and 1.819″ eastward to agree with this chart."

(351) For example: One of the coordinates of the anchorage of 33 CFR 110.30(m), Boston Inner Harbor A, is the point 42°21′31.62″N, 71°02′52.37″W. When this anchorage was originally laid out, chart 13272, was on horizontal datum of NAD 27. The current edition of chart 13272 is on NAD 83. Accordingly, to plot the above point on the current chart, first add 0.351″ to the latitude and subtract 1.819″ from the longitude.

(352) **Case II.** When the magnitude of the shift between the existing chart datum and **NAD 83 does not result in a significant plottable difference**, on a chart converted to NAD 1983, a note similar to the following appears on the chart:

(353) **"HORIZONTAL DATUM**

(354) The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83), which for charting purposes is considered equivalent to the World Geodetic System 1984 (WGS 84). Geographic positions referred to (name of the old datum) do not require conversion to NAD 83 for plotting on this chart."

(355) **Case III.** If a chart is not yet on NAD 83, and NOS republishes same without converting it to NAD 83, a note similar to the following appears on the chart:

(356) **"HORIZONTAL DATUM**

(357) The horizontal reference datum of this chart is (name of the datum). Geographic positions on North American Datum of 1983 (NAD 83) must be corrected an average of _____″ northward/southward and _____″ eastward/westward to agree with this chart. For charting purposes, NAD 83 is considered equivalent to the World Geodetic System of 1984 (WGS 1984) datum."

(358) Nautical chart changes by NOS involving latitude and longitude coordinates, published in Notices to Mariners, include which horizontal datum was used for the coordinates.

(359) Federal Regulations published by the Coast Guard (in **33 CFR**) involving geographic positions (latitude and longitude) include which horizontal datum was used for the coordinates. For example, **33 CFR 110.238**, Apra Harbor, Guam, contains "Datum: (WGS 84)".

(360) **Accuracy of a nautical chart.**–The value of a nautical chart depends upon the accuracy of the surveys on which it is based. The chart reflects what was found by field surveys and what has been reported to NOS headquarters. The chart represents general conditions at the time of surveys or reports and does not necessarily portray present conditions. Significant changes may have taken place since the date of the last survey or report.

(361) Each sounding represents an actual measure of depth and location at the time the survey was made, and each bottom characteristic represents a sampling of the surface layer of the lake bottom at the time of sampling. Areas where sand and mud prevail, especially the entrances and approaches to bays and rivers exposed to strong currents and heavy seas, are subject to continual change.

(362) In regions where rocks and boulders abound, it is always possible that surveys may have failed to find every obstruction. Thus, when navigating such waters, customary routes and channels should be followed and areas avoided where irregular and sudden changes in depth indicate conditions associated with pinnacle rocks or boulders.

(363) Information charted as "reported" should be treated with caution in navigating the area, because the actual conditions have not been verified by Government surveys.

(364) The **date of a chart** is of vital importance to the navigator. When charted information becomes obsolete, further use of the chart for navigation may be dangerous. Announcements of new editions of nautical charts are usually published in notices to mariners. The publication, **Dates of Latest Editions**, published quarterly, gives the edition and date of the latest edition of charts published by NOS. It is distributed to sales agents; free copies may be obtained from the sales agents or by writing to Distribution Division (N/ACC3), National Ocean Service. (See appendix for address.)

(365) **Source diagrams.**–The Coast and Geodetic Survey has recently committed to adding a source diagram to all charts 1:500,000 scale and larger. This diagram is intended to provide the mariner with additional information about the density and reliability of the sounding data depicted on the chart. The adequacy with which sounding data depicts the configuration of the bottom depends on the following factors:

(366) •Survey technology employed (sounding and navigation equipment).

(367) •Survey specifications in effect (prescribed survey line spacing and sounding interval).

(368) •Type of bottom (e.g., rocky with existence of submerged pinnacles, flat sandy, coastal deposits subject to frequent episodes of deposition and erosion).

(369) Depth information on nautical charts is based on soundings from the latest available hydrographic survey, which in many cases may be quite old. The age of hydrographic surveys supporting nautical charts varies. Approximately 60 percent of inshore hydrography was acquired by **leadline** (pre-1940) sounding technology.

(370) The sounding information portrayed on NOAA nautical charts is considered accurate but does not, as noted above, represent a complete picture of the seafloor because older sounding technologies only collected discrete samples. For example, a leadline survey provides only a single point sounding. **Electronic echo sounders,** which came into common use during the 1940's, collected continuous soundings along the path of the survey vessel, but no information between survey lines. Full bottom coverage technology which is transitioning into use as a supplemental method in the early 1990's, will make leadline and conventional echo sounder technologies obsolete in areas of complex bathymetry.

(371) The following shows the eras of survey technology and their impact on the adequacy with which the bottom configuration is portrayed.

(372) Prior to 1940: The majority of survey data acquired prior to 1940 consisted of leadline soundings which were positioned using horizontalsextant angles. This positioning method is considered to be accurate.

(373) A deficiency with pre-1940 data exists in the leadline sounding method because it represents discrete single-point sampling. Depths of areas between or outside of leadline sounding points can only be inferred or estimated leaving the possibility of undetected features, especially in areas of irregular relief.

(374) 1940 to present: During this period sounding data has been collected using continuous recording single-beam echo sounders which yield a graphic record of the entire sounding line—not just isolated points.Using this graphic record, features which fall between the standard position fixes can be inserted into the data set. Positioning of the sounding vessel in this era has varied from horizontal sextant angles to modern Global Positioning System satellite fixes.

(375) Although the sampling is continuous along the track of the sounding vessel, features can be missed between sounding lines.

(376) The spacing of sounding lines required to survey an area depends on several factors; such as water depths, bottom configuration, survey scale, general nature of the area, and the purpose of the survey. For example, a 1:10,000-scale survey conducted in an estuary will typically have 100-meter line spacing requirements, but may be reduced to 50 meters or less to adequately develop an irregular bottom, shoal, or some other feature that may present a hazard to navigation. Also, hydrographic project instructions for surveys may have required line spacing that deviates from these general specifications.

(377) The following table shows the various sounding technologies, line spacings, and areas or depths for each given period of hydrographic surveying. The terminology used to describe the different types of bottom in the table are derived from the first through fourth editions of the Hydrographic Manual and Hydrographic Survey Guideline No. 69.

(378) Referring to the accompanying sample Source Diagram and the above discussion of survey methods over time, a mariner transiting from Point X to Point Y, along the track indicated by the **dotted line**, would have the following information available about the relative quality of the depth information shown on the chart.

(379) •Point X lies in an area surveyed by NOS in 1926-27 at a scale of 1:100,000. The sounding data would have been collected by leadline. Depths between sounding points can only be inferred, and undetected features might exist between the sounding points in areas of irregular relief. Caution should be exercised.

(380) •The transit continues to cross areas surveyed by NOS in the 1920's using leadline survey technology. As depths decrease, the line spacing decreases, but depths still can only be inferred between sounding points. Shoals and undetected features might exist between the sounding points in areas of irregular relief. Caution must still be exercised.

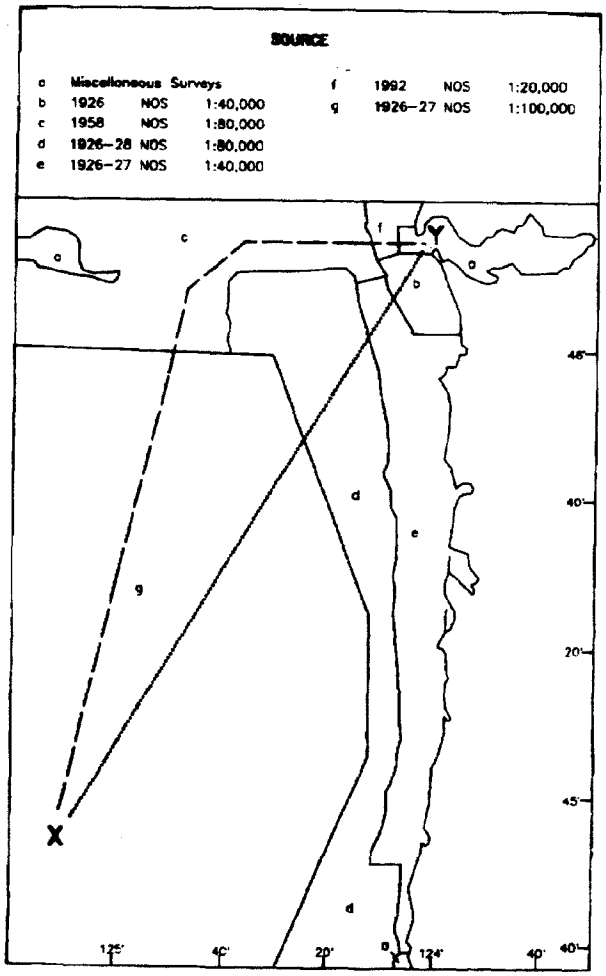
(381) •The transit ends in an area charted from miscellaneous surveys. These surveys may be too numerous to depict or vary in age, reliability, origin, or technology used. No inferences about the fitness of the data can be made in this area from the diagram.

(382) Referring again to the accompanying sample Source Diagram, and the above discussion of survey methods over time, a mariner could choose to transit from Point X to Point Y, along the track shown with a **dashed line**.

(383) •The transit again starts in an area surveyed by NOS in 1926-27 at a scale of 1:100,000. The sounding data would have

| ERA | SOUNDING TECHNOLOGY | MAXIMUM LINE SPACING | AREAS OR DEPTHS |
|---|---|---|---|
| PRE-1940 | Leadline | 50 Meters | Anchorages, Channel Lines |
| | | | **Open Coast** |
| | | | Even Botton |
| | | 200-300 Meters | 0-10 Fathoms |
| | | 0.5 Mile | 10-15 Fathoms |
| | | 1-4 Miles | 15-100 Fathoms |
| | | Reduced as Necessary | Uneven Bottom |
| 1940 TO 1989 | Continuous Recording Echo-sounder | | **Harbors & Restricted Areas** |
| | | 50 Meters | Shoal Development |
| | | 100 Meters | <20 Fathoms |
| | | 200 Meters | 20-30 Fathoms |
| | | 400 Meters | >30 Fathoms |
| | | | **Open Coast** |
| | | | Irregular Bottom |
| | | 100 Meters | <20 Fathoms (Rocky points, spits & channel entrances) |
| | | | Smooth Bottom |
| | | 200 Meters | <20 Fathoms (All Other Areas) |
| | | 400 Meters | 20-30 Fathoms |
| | | 800 Meters | 30-110 Fathoms |
| | | 1600 Meters | 110-500 Fathoms |
| 1989 TO PRESENT | Continuous Recording Echo-sounder (Metrication) | | **Harbors & Restricted Areas** |
| | | 100 Meters | <30 Meters |
| | | 200 Meters | 30-50 Meters |
| | | 400 Meters | >50 Meters |
| | | | **Open Coast** |
| | | 100 Meters | <30 Meters (Rocky points, spits & channel entrances) |
| | | 200 Meters | <30 Meters (All Other Areas) |
| | | 400 Meters | 30-50 Meters |
| | | 800 Meters | 50-200 Meters |
| | | 1600 Meters | 200-900 Meters |

## SOURCE DIAGRAM




been collected by leadline. Depths between sounding points can only be inferred, and undetected features might exist between sounding points in areas of irregular relief. Caution should be exercised.

(384) •The transit then crosses an area surveyed by NOS in 1958 at a scale of 1:80,000. The charted hydrography in this area would have been acquired by continuous recording single beam echo sounder. It is possible that features could have been missed between sounding lines, although echo sounders record all depths along a sounding line with varying beam widths.

(385) •The transit then crosses an area surveyed by NOS in 1992 at a scale of 1:20,000. The data is collected in metric units acquired by continuous recording single beam echo sounder. It is possible that features could have been missed between sounding lines, although echo sounders record all depths along a sounding line with varying beam widths.

(386) •The transit ends in an area where the charted hydrography is derived from miscellaneous surveys. These surveys may be too numerous to depict or vary in age, reliability, origin, or technology used. No inferences about the fitness of the data can be made in this area from the diagram.

(387) By choosing to transit along the track shown by the dashed line, the mariner would elect to take advantage of more recent survey information collected with more modern technology.

(388) **U.S. Nautical Chart Numbering System.**–This chart numbering system, adopted by the National Ocean Service and the National Imagery and Mapping Agency, provides for a uniform method of identifying charts published by both agencies. Nautical charts published by the Canadian Hydrographic Service are identified in this Coast Pilot by an asterisk preceding the chart number.

(389) **Corrections to charts.**–It is essential for navigators to keep charts corrected through information published in the notices to mariners, especially since the NOS no longer hand-corrects charts prior to distribution.

(390) **Caution in using small-scale charts.**–Dangers to navigation cannot be shown with the same amount of detail on small-scale charts as on those of larger scale. Therefore, the largest scale chart of an area should always be used.

(391) The **scales of nautical charts** range from 1:2,500 to about 1:5,000,000. Graphic scales are generally shown on charts with scales of 1:80,000 or larger, and numerical scales are given on smaller scale charts. NOS charts are classified according to scale as follows:

(392) **Sailing charts,** scales 1:600,000 and smaller, are for use in fixing the mariner's position as he approaches the coast from the open ocean, or for sailing between distant coastwise ports. On such charts the shoreline and topography are generalized and only offshore soundings, and the principal lights, outer buoys, and landmarks visible at considerable distances are shown.

(393) **General charts,** scales 1:150,000 to 1:600,000, are for coastwise navigation outside of outlying reefs and shoals.

(394) **Coast charts,** scales 1:50,000 to 1:150,000, are for inshore navigation leading to bays and harbors of considerable width and for navigating large inland waterways.

(395) **Harbor charts,** scales larger than 1:50,000, are for harbors, anchorage areas, and the smaller waterways.

(396) Several categories of special charts are published for the waters of the Great Lakes. **Small-craft charts** contain information of interest to small-craft operators and fold into convenient panels. **Recreational-craft charts** are a series of large-scale charts of certain harbors and confined localities published in book form. **Canoe charts** provide coverage of the Minnesota-Ontario Border Lakes for small shallow-draft vessels. Most of the canoe charts do not show hydrography.

(397) **Blue tint in water areas.**–A blue tint is shown in water areas on many charts to accentuate shoals and other areas considered dangerous for navigation when using that particular chart. Since the danger curve varies with the intended purpose of a chart, a careful inspection should be made to determine the contour depth of the blue tint areas.

(398) **Caution on bridge and cable clearances.**–For bascule bridges whose spans do not open to a full vertical position, unlimited overhead clearance is not available for the entire charted horizontal clearance when the bridge is open, due to the inclination of the drawspans over the channel.

(399) The charted clearances of overhead cables are for the lowest wires at Low Water Datum unless otherwise stated. **Vessels with masts, stacks, booms, or antennas should allow sufficient clearance under power cables to avoid arcing.**

(400) **Submarine cables and submerged pipelines** cross many waterways used by both large and small vessels. Numerous water intakes extend from the lakeshores. The intake cribs at the outer ends of these pipelines may extend significantly above the lake bottom. In some Canadian waters there are extensive networks of

submerged pipelines carrying natural gas. The wellheads extend significantly above the lake bottom. Submerged structures in inshore waters are generally buried below the lakebed or riverbed, while offshore structures may lie on the lakebed. Warning signs are often posted to warn mariners of the existence of submarine cables and pipelines.

(401) The installation of submarine cables or pipelines in U.S. waters or the continental shelf of the United States is under the jurisdiction of one or more Federal agencies, depending on the nature of the installation. They are shown on the charts when the necessary information is reported to NOS and they have been recommended for charting by the cognizant agency. The chart symbols for submarine cable and pipeline areas are usually shown for inshore areas, whereas, chart sumbols for submarine cable and pipeline routes may be shown for offshore areas. Submarine cables and pipelines are not usually described in the Coast Pilots.

(402) In view of the serious consequences resulting from damage to submarine cables and pipelines, vessel operators should take special care when anchoring, fishing, or engaging in underwater operations near areas where these cables or pipelines may exist or have been reported to exist. Mariners are also warned that the areas where cables and pipelines were originally buried may have changed and they may be exposed; extreme caution should be used when operating vessels in depths of water comparable to the vessel's draft.

(403) Certain cables carry high voltage, while many pipelines carry natural gas under high pressure or petroleum products. Electrocution, fire, or explosion with injury, loss of life, or a serious pollution incident could occur if they are broached.

(404) Vessels fouling a submarine cable or pipeline should attempt to clear without undue strain. Anchors or gear that cannot be cleared should be slipped, but no attempt should be made to cut a cable or pipeline.

(405) **Artificial obstructions to navigation.–Disposal areas** are designated by the Corps of Engineers for depositing dredged material where existing depths indicate that the intent is not to cause sufficient shoaling to create a danger to surface navigation. The areas are charted without blue tint, and soundings and depth curves are retained.

(406) **Disposal Sites** are areas established by Federal regulation **(40 CFR 220-229)** in which dumping of dredged and fill material and other nonbuoyant objects is allowed with the issuance of a permit. Dumping of dredged and fill material is supervised by the Corps of Engineers and all other dumping by the Environmental Protection Agency (EPA). (See Corps of Engineers and Environmental Protection Agency, this chapter, and appendix for office addresses.)

(407) **Dumping Grounds** are also areas that were established by Federal regulation **(33 CFR 205)**. However, these regulations have been revoked and the use of the areas discontinued. These areas will continue to be shown on nautical charts until such time as they are no longer considered to be a danger to navigation.

(408) Disposal Sites and Dumping Grounds are rarely mentioned in the Coast Pilot, but are shown on nautical charts. **Mariners are advised to exercise extreme caution in and in the vicinity of all dumping areas.**

(409) **Spoil areas** are for the purpose of depositing dredged material, usually near and parallel to dredged channels; they are usually a hazard to navigation. Spoil areas are usually charted from survey drawings from Corps of Engineers after-dredging surveys, though they may originate from private or other Government agency surveys. Spoil areas are tinted blue on the charts and labeled, and all soundings and depth curves are omitted. Navigators of even the smallest craft should avoid crossing spoil areas.

(410) **Fish havens** are established by private interests, usually sport fishermen, to simulate natural reefs and wrecks that attract fish. The reefs are constructed by dumping assorted junk, ranging from old trolley cars and barges to scrap building material, in areas which may be of very small extent or may stretch a considerable distance along a depth curve; old automobile bodies are a commonly used material. The Corps of Engineers must issue a permit, specifying the location and depth over the reef, before such a reef may be built. However, the reefbuilders' adherence to permit specifications can be checked only with a wire drag. Fish havens are outlined and labeled on the charts and show the minimum authorized depth when known. Fish havens are tinted blue if they have a minimum authorized depth of 11 fathoms or less or if the minimum authorized depth is unknown and they are in depths greater than 11 fathoms but still considered a danger to navigaton. Navigators should be cautious about passing over fish havens or anchoring in their vicinity.

(411) **Fishtrap areas** are areas established by the Corps of Engineers, or State or local authority, in which traps may be built and maintained according to established regulations. The fish stakes which may exist in these areas are obstructions to navigation and may be dangerous. The limits of fishtrap areas and a cautionary note are usually charted. Navigators should avoid these areas.

(412) **Local magnetic disturbances.**–If measured values of magnetic variation differ from the expected (charted) values by several degrees, a magnetic disturbance note will be printed on the chart. The note will indicate the location and magnitude of the disturbance, but the indicated magnitude should not be considered as the largest possible value that may be encountered. Large disturbances are more frequently detected in the shallow waters near land masses than in deep water. Generally, the effect of a local magnetic disturbance diminishes rapidly with distance, but in some locations there are multiple sources of disturbances and the effects may be distributed for many miles.

(413) **Compass roses on charts.**–Each compass rose shows the date, magnetic variation, and the annual change in variation. Prior to the new edition of a nautical chart, the compass roses are reviewed. Corrections for annual change and other revisions may be made as a result of newer and more accurate information. On some general and sailing charts, the magnetic variation is shown by isogonic lines in addition to the compass roses.

(414) The **Polyconic projection** is used on most U.S. nautical charts of the Great Lakes. On this projection, parallels of latitude appear as nonconcentric circles, and meridians appear as curved lines converging toward the pole and concave to the central meridian. The scale is correct along any parallel and along the central meridian of the projection. Along other meridians the scale increases with increased difference of longitude from the central meridian.

(415) The **Mercator projection** used on some nautical charts of the Great Lakes has straight-line meridians and parallels that intersect at right angles. On any particular chart the distances between meridians are equal throughout, but distances between parallels increase progressively from the Equator toward the poles, so that a straight line between any two points is a rhumb line. This unique property of the Mercator projection is one of the main reasons why it is preferred by the mariner.

(416) **Echo soundings.**–Ships' echo sounders may indicate small variations from charted soundings; this may be due to the fact that various corrections (instrument corrections, settlement and squat, draft, and velocity corrections) are made to echo sound-

ings in surveying which are not normally made in ordinary navigation, or to observational errors in reading the echo sounder. Instrument errors vary between different equipment and must be determined by calibration aboard ship. Most types of echo sounders are factory calibrated for a velocity of sound in water of 800 fathoms per second, but the actual velocity may differ from the calibrated velocity by as much as 5 percent, depending upon the temperature and salinity of the waters in which the vessel is operating; the highest velocities are found in warm, highly saline water, and the lowest in icy freshwater. Velocity corrections for these variations are determined and applied to echo soundings during hydrographic surveys. All echo soundings must be corrected for the vessel's draft, unless the draft correction has been set on the echo sounder.

(417) Observational errors include misinterpreting false echos from schools of fish, seaweed, etc., but the most serious error which commonly occurs is where the depth is greater than the scale range of the instrument; a 400-fathom scale indicates 15 fathoms when the depth is 415 fathoms. Caution in navigation should be exercised when wide variations from charted depths are observed.

## AIDS TO NAVIGATION

(418) **Aids to navigation** in United States waters of the Great Lakes and their connecting waters, except for the St. Lawrence River, are maintained by the U.S. Coast Guard. Local jurisdiction for the region is assigned to the Commander, Ninth Coast Guard District. The Lake Champlain region and the Hudson River are under the jurisdiction of the Commander, Third Coast Guard District. (See appendix for addresses.)

(419) **Reporting of defects in aids to navigation.**–Promptly notify the nearest Coast Guard District Commander if an aid to navigation is observed to be missing, sunk, capsized, out of position, damaged, extinguished, or showing improper characteristics.

(420) Radio messages should be prefixed "Coast Guard" and transmitted directly to any U.S. Government shore radio station for relay to the Coast Guard District Commander. Merchant ships may send messages relating to defects noted in aids to navigation through commercial facilities only when they are unable to contact a U.S. Government shore radio station. Charges for these messages will be accepted "collect" by the Coast Guard.

(421) It is unlawful to establish or maintain any aid similar to those maintained by the U.S. Coast Guard without first obtaining permission from the Coast Guard District Commander. In the Great Lakes, applications should be submitted through the Cleveland District Office. The licensed officer in command of a vessel which collides with any aid must report the fact promptly to the nearest Marine Safety Office or Marine Inspection Office, U.S. Coast Guard.

(422) **Lights.**–The range of visibility of lights as given in the Light Lists and as shown on the charts is the **Nominal range,** which is the maximum distance at which a light may be seen in clear weather (meteorological visibility of 11.5 statute miles) expressed in statute miles. The Light Lists give the Nominal ranges for all Coast Guard lighted aids except range and directional lights. **Luminous range** is the maximum distance at which a light may be seen under the existing visibility conditions. By use of the diagram in the Light Lists, Luminous range may be determined from the known Nominal range, and the existing visibility conditions. Both the Nominal and Luminous ranges do not take into account elevation, observer's height of eye, or the curvature of the earth. **Geographic range** is a function of only the curvature of the earth and is determined solely from the heights above sea level of the light and the observer's eye; therefore, to determine the actual geographic range for a height of eye, the Geographic range must be corrected by a distance corresponding to the height difference, the distance correction being determined from a table of "distances of visibility for various heights above sea level." (See Light List or Coast Pilot table following appendix.) The maximum distances at which lights can be seen may at times be increased by abnormal atmospheric refraction and may be greatly decreased by unfavorable weather conditions, such as fog, rain, haze, or smoke. All except the most powerful lights are easily obscured by such conditions. In some conditions of the atmosphere white lights may have a reddish hue. During weather conditions which tend to reduce visibility, colored lights are more quickly lost to sight than are white lights. Navigational lights should be used with caution because of the following conditions that may exist:

(423) A light may be extinguished and the fact not reported to the Coast Guard for correction, or a light may be located in an isolated area where it will take time to correct.

(424) In regions where ice conditions prevail, the lantern panes of unattended lights may become covered with ice or snow, which will greatly reduce the visibility and may also cause colored lights to appear white.

(425) Brilliant shore lights used for advertising and other purposes, particularly those in densely populated areas, make it difficult to identify a navigational light.

(426) At short distances flashing lights may show a faint continuous light between flashes.

(427) The distance of an observer from a light cannot be estimated by its apparent intensity. The characteristics of lights in an area should always be checked in order that powerful lights visible in the distance will not be mistaken for nearby lights showing similar characteristics at low intensity such as those on lighted buoys.

(428) The apparent characteristic of a complex light may change with the distance of the observer, due to color and intensity variations among the different lights of the group. The characteristic as charted and shown in the Light List may not be recognized until nearer the light.

(429) Motion of a vessel in a heavy sea may cause a light to alternately appear and disappear, and thus give a false characteristic.

(430) Where lights have different colored sectors, be guided by the correct bearing of the light; do not rely on being able to accurately observe the point at which the color changes. On either side of the line of demarcation of colored sectors there is always a small arc of uncertain color.

(431) On some bearings from the light, the range of visibility of the light may be reduced by obstructions. In such cases, the obstructed arc might differ with height of eye and distance. When a light is cut off by adjoining land and the arc of visibility is given, the bearing on which the light disappears may vary with the distance of the vessel from which observed and with the height of eye. When the light is cut off by a sloping hill or point of land, the light may be seen over a wider arc by a ship far off than by one close to.

(432) Arcs of circles drawn on charts around a light are not intended to give information as to the distance at which it can be seen, but solely to indicate, in the case of lights which do not show equally in all directions, the bearings between which the variation of visibility of obscuration of the light occurs.

(433) Lights of equal candlepower but of different colors may be seen at different distances. This fact should be considered not only

in predicting the distance at which a light can be seen, but also in identifying it.

(434) Lights should not be passed close aboard, because in many cases riprap mounds are maintained to protect the structure against ice damage and scouring action.

(435) Many prominent towers, tanks, smokestacks, buildings, and other similar structures, charted as landmarks, display flashing and/or fixed red aircraft obstruction lights. Lights shown from landmarks are charted only when they have distinctive characteristics to enable the mariner to positively identify the location of the charted structure.

(436) **Articulated lights.**–An articulated light is a vertical pipe structure supported by a submerged buoyancy chamber and attached by a universal coupling to a weighted sinker on the seafloor. The light, allowed to move about by the universal coupling, is not as precise as a fixed aid. However, it has a much smaller watch circle than a conventional buoy, because the buoyancy chamber tends to force the pipe back to a vertical position when it heels over under the effects of wind, wave, or current.

(437) **Articulated daybeacons.**-Same description as for articulated lights (see above) except substitute daybeacon for light.

(438) **Bridge lights and clearance gages.**–The Coast Guard regulates marine obstruction lights and clearance gages on bridges across navigable waters. Where installed, clearance gages are generally vertical numerical scales, reading from top to bottom, and show the actual vertical clearance between the existing water level and the lowest point of the bridge over the channel; the gages are normally on the right-hand pier or abutment of the bridge, on both the upstream and downstream sides.

(439) Bridge lights are fixed red or green, and are privately maintained; they are generally not charted or described in the text of the Coast Pilots. All bridge piers (and their protective fenders) and abutments which are in or adjacent to a navigation channel are marked on all channel sides by red lights. On each channel span of a fixed bridge, there is a range of two green lights marking the center of the channel and a red light marking both edges of the channel, except that when the margins of the channel are confined by bridge piers, the red lights on the span are omitted, since the pier lights then mark the channel edges; for multiplespan fixed bridges, the main channel span may also be marked by three white lights in a vertical line above the green range lights.

(440) On all types of drawbridges, one or more red lights are shown from the drawspan (higher than the pier lights) when the span is closed; when the span is open, the higher red lights are obscured and one or two green lights are shown from the drawspan, higher than the pier lights. The number and location of the red and green lights depend upon the type of drawbridge.

(441) Bridges and their lighting, construction, and maintenance are set forth in **33 CFR 114, 115, 116, and 118** (not carried in this Coast Pilot). Aircraft obstruction lights, prescribed by the Federal Aviation Administration, may operate at certain bridges.

(442) **Fog signals.**–Caution should be exercised in the use of sound fog signals for navigation purposes. They should be considered solely as warning devices.

(443) Sound travels through the air in a variable manner, even without the effects of wind; therefore, the hearing of fog signals cannot be implicitly relied upon.

(444) Experience indicates that distances must not be judged only by the intensity of the sound; that occasionally there may be areas close to a fog signal in which it is not heard; and that fog may exist not far from a station, yet not be seen from it, so the signal may not be operating. It is not always possible to start a fog signal immediately when fog is observed.

(445) **Avoidance of collision with offshore light stations, and large navigational buoys (LNB).**–Courses should invariably be set to pass these aids with sufficient clearance to avoid the possibility of collision from any cause. Errors of observation, current and wind effects, other vessels in the vicinity, and defects in steering gear may be, and have been, the cause of actual collisions, or imminent danger thereof, needlessly jeopardizing the safety of these facilities and their crews, and of all navigation dependent on these important aids to navigation.

(446) Experience shows that offshore light stations cannot be safely used as leading marks to be passed close aboard, but should always be left broad off the course, whenever sea room permits. When approaching fixed offshore light structures and large navigational buoys (LNB) on radio bearings, the risk of collision will be avoided by ensuring that radio bearing does not remain constant.

(447) It should be borne in mind that most large buoys are anchored to a very long scope of chain and, as a result, the radius of their swinging circle is considerable. The charted position is the location of the anchor. Furthermore, under certain conditions of wind and current, they are subject to sudden and unexpected sheers which are certain to hazard a vessel attempting to pass close aboard.

(448) **Buoys.**–The aids to navigation depicted on charts comprise a system consisting of fixed and floating aids with varying degrees of reliability. Therefore, prudent mariners will not rely solely on any single aid to navigation, particularly a floating aid.

(449) The approximate position of a buoy is represented by the dot or circle associated with the buoy symbol. The approximate position is used because of practical limitations in positioning and maintaining buoys and their sinkers in precise geographical locations. These limitations include, but are not limited to, inherent imprecisions in position fixing methods, prevailing atmospheric and lake conditions, the slope of and the material making up the lakebed, the fact that buoys are moored to sinkers by varying lengths of chain, and the fact that buoy body and/or sinker positions are not under continuous surveillance, but are normally checked only during periodic maintenance visits which often occur more than a year apart. The position of the buoy body can be expected to shift inside and outside of the charting symbol due to the forces of nature. The mariner is also cautioned that buoys are liable to be carried away, shifted, capsized, sunk, etc. Lighted buoys may be extinguished or sound signals may not function as a result of ice, running ice or other natural causes, collisions, or other accidents.

(450) For the foregoing reasons, a prudent mariner must not rely completely upon the charted position or operation of floating aids to navigation, but will also utilize bearings from fixed objects and aids to navigation on shore. Further, a vessel attempting to pass close aboard always risks collision with a yawing buoy or with the obstruction the buoy marks.

(451) Buoys may not always properly mark shoals or other obstructions due to shifting of the shoals or of the buoys. Buoys marking wrecks or other obstructions are usually placed on the lakeward or channelward side and not directly over a wreck. Since buoys may be located some distance from a wreck they are intended to mark, and since sunken wrecks are not always static, extreme caution should be exercised when operating in the vicinity of such buoys.

(452) **Caution, channel markers.**–Lights, daybeacons, and buoys along dredged channels do not always mark the bottom edges. Due to local conditions, aids may be located inside or outside the channel limits shown by dashed lines on a chart. The

Light List tabulates the offset distances for these aids in many instances.

(453) Aids may be moved, discontinued, or replaced by other types to facilitate dredging operations. Mariners should exercise caution when navigating areas where dredges with auxiliary equipment are working.

(454) Temporary changes in aids are not included on the charts.

(455) **Radiobeacons.**–A map showing the locations and operating details of marine radiobeacons is given in each Light List. This publication describes the procedure to follow in using radiobeacons to calibrate radio direction finders as well as listing special radio direction finder calibration stations.

(456) A vessel steering a course for a radiobeacon should observe the same precautions as when steering for a light or any other mark. If the radiobeacon is aboard a lightship, particular care should be exercised to avoid the possibility of collision, and sole reliance should never be placed on sighting the lightship or hearing its fog signal. If there are no dependable means by which the vessel's position may be fixed and the course changed well before reaching the lightship, a course should be selected that will ensure passing the lightship at a distance, rather than close aboard, and repeated bearings of the radiobeacon should show an increasing change in the same direction.

(457) **Radio bearings.**–No exact data can be given as to the accuracy to be expected in radio bearings taken by a ship, since the accuracy depends to a large extent upon the skill of the ship's operator, the condition of the ship's equipment, and the accuracy of the ship's calibration curve. Mariners are urged to obtain this information for themselves by taking frequent radio bearings when their ship's position is accurately known and recording the results.

(458) Radio bearings obtained at twilight or at night, and bearings which are almost parallel to the shore, should be accepted with reservations, due to "night effect" and to the distortion of radio waves which travel over land. Bearings of aircraft ranges and standard broadcast stations should be used with particular caution due to coastal refraction and lack of calibration of their frequencies.

(459) **Conversion of radio bearings to Mercator bearings.**–Radio directional bearings are the bearings of the great circles passing through the radio stations and the ship, and, unless in the plane of the Equator or a meridian, would be represented on a Mercator chart as curved lines. Obviously it is impracticable for a navigator to plot such lines on a Mercator chart, so it is necessary to apply a correction to a radio bearing to convert it into a Mercator bearing, that is the bearing of a straight line on a Mercator chart laid off from the sending station and passing through the receiving station.

(460) A table of corrections for the conversion of a radio bearing into a Mercator bearing follows the appendix. It is sufficiently accurate for practical purposes for distances up to 1,000 miles.

(461) The only data required are the latitudes and longitudes of the radiobeacons and of the ship by dead reckoning. The latter is scaled from the chart, and the former is either scaled from the chart or taken from the Light List.

(462) The table is entered with the differences of longitude in degrees between the ship and station (the nearest tabulated value being used), and opposite the middle latitude between the ship and station, the correction to be applied is read.

(463) The sign of the correction (bearings read clockwise from the north) will be as follows: In N latitude, the minus sign is used when the ship is E of the radiobeacon and the plus sign used when the ship is W of the radiobeacon. In S latitude, the plus sign is used when the ship is E of the radiobeacon, and the minus sign is used when the ship is W of the radiobeacon.

(464) To facilitate plotting, 180 degrees should be added to or subtracted from the corrected bearing, and the result plotted from the radiobeacon.

(465) Should the position by dead reckoning differ greatly from the true position of the ship as determined by plotting the corrected bearings, retrial should be made, using the new value as the position of the ship.

(466) **Radio bearings from other vessels.**–Any vessel with a radio direction finder can take a bearing on a vessel equipped with a radio transmitter. These bearings, however, should be used only as a check, as comparatively large errors may be introduced by local conditions surrounding the radio direction finder unless known and accounted for. Although any radio station, for which an accurate position is definitely known, may serve as a radiobeacon for vessels equipped with a radio direction finder, extreme caution must be exercised in their use. Stations established especially for maritime services are more reliable.

(467) **Radar beacons (Racons)** are low-powered radio transceivers that operate in the marine radar X-band frequencies. When activated by a vessel's radar signal, Racons provide a distinctive visible display on the vessel's radarscope from which the range and bearing to the beacon may be determined. (See Light List, NIMA Pub. 117, or Canadian Notice to Mariners Annual Edition for details.)

(468) **LORAN-C.**–LORAN, an acronym for LOng RAnge Navigation, is an electronic aid to navigation consisting of shore-based radio transmitters. The LORAN system enables users equipped with a LORAN receiver to determine their position quickly and accurately, day or night, in practically any weather.

(469) A LORAN-C chain consists of three to five transmitting stations separated by several hundred miles. Within a chain, one station is designated as master while the other stations are designated as secondaries. Each secondary station is identified as either whiskey, x-ray, yankee, or zulu.

(470) The master station is always the first station to transmit. It transmits a series of nine pulses. The secondary stations then follow in turn, transmitting eight pulses each, at precisely timed intervals. This cycle repeats itself endlessly. The length of the cycle is measured in microseconds and is called a Group Repetition Interval (GRI).

(471) LORAN-C chains are designated by the four most significant digits of their GRI. For example, a chain with a GRI of 89,700 microseconds is referred to as 8970. A different GRI is used for each chain because all LORAN-C stations broadcast in the same 90 to 110 kilohertz frequency band and would otherwise interfere with one another.

(472) The LORAN-C system can be used in either a hyperbolic or range mode. In the widely used hyperbolic mode, a LORAN-C line of position is determined by measuring the time difference between sychronized pulses received from two separate transmitting stations. In the range mode, a line of position is determined by measuring the time required by LORAN-C pulses to travel from a transmitting station to the user's receiver.

(473) A user's position is determined by locating the crossing point of two lines of position on a LORAN-C chart. Many receivers have built-in coordinate converters which will automatically display the receiver's latitude and longitude. With a coordinate converter, a position can be determined using a chart that is not overprinted with LORAN-C lines of position.

(474) **CAUTION: The latitude/longitude computation on some models is based upon an all seawater propagation path.**

**This may lead to error if the LORAN-C signals from the various stations involve appreciable overland propagation paths. These errors may put the mariner at risk in areas requiring precise positioning if the proper correctors (ASF) are not applied. Therefore, it is recommended that mariners using Coordinate Converters check the manufacturer's operating manual to determine if and how corrections are to be applied to compensate for the discontinuity caused by the overland paths.**

(475) There are two types of LORAN-C accuracy: absolute and repeatable. Absolute accuracy is a measure of the navigator's ability to determine latitude and longitude position from the LORAN-C time differences measured. Repeatable accuracy is a measure of the LORAN-C navigator's ability to return to a position where readings have been taken before.

(476) The absolute accuracy of LORAN-C is 0.25 nautical miles, 95% confidence within the published coverage area using standard LORAN-C charts and tables. Repeatable accuracy depends on many factors, so measurements must be taken to determine the repeatable accuracy in any given area. Coast Guard surveys have found repeatable accuracies between 30 and 170 meters in most ground wave coverage areas. LORAN-C position determination on or near the baseline extensions are subject to significant errors and, therefore, should be avoided whenever possible. The use of skywaves is not recommended within 250 miles of a station being used, and corrections for these areas are not usually tabulated.

(477) If the timing or pulse shape of a master-secondary pair deviates from specified tolerances, the first two pulses of the secondary station's pulse train will blink on and off. The LORAN-C receiver sees this blinking signal and indicates a warning to the user. This warning will continue until the signals are once again in tolerance. A blinking signal is not exhibited during off-air periods, so a separate receiver alarm indicates any loss of signal. Never use a blinking secondary signal for navigation.

(478) In coastal waters, LORAN-C should not be relied upon as the only aid to navigation. A prudent navigator will use radar, radio direction finder, fathometer and any other aid to navigation, in addition to the LORAN-C receiver.

(479) **LORAN-C Interference**

(480) Interference to LORAN-C may result from radio transmissions by public or private sources operating near the LORAN-C band of 90-110 kHz.

(481) **LORAN-C Charts and Publications**

(482) Navigational charts overprinted with LORAN-C lines of position are available from National Ocean Service, Distribution Division (N/ACC3). (See appendix for address).

(483) A general source of LORAN-C information is the LORAN-C User Handbook written by the U.S. Coast Guard. This publication can be purchased from the U.S. Government Printing Office, Washington, DC. (See Appendix for address.)

(484) **GPS Navigation System**.– GPS is a space-based positioning, velocity, and time system that has three major segments: space, control, and user. The Space Segment is composed of 24 satellites in six orbital planes. The satellites operate in circular 20,200 km (10,900 nm) orbits at an inclination angle, relative to the equator, of 55° and with a 12-hour period. The system normally operates with twenty-one satellites in service, the remaining three serving as active spares. At any given time, a minimum of four satellites are observable from any position on earth, providing instantaneous position information. Each satellite transmits on two L band frequencies: 1575.42 MHz (L1) and 1227.6 MHz (L2). L1 carries a precise (P) code and a course/acquisition (C/A) code. L2 carries the P code. A navigation data message is superimposed on the codes. The same navigation data message is carried on both frequencies. This message contains satellite ephemeris data, atmospheric propogation correction data, and satellite clock bias.

(485) The Control Segment consists of five monitor stations, three of which have uplink capabilities, located in Colorado, Hawaii, Kwajalein, Diego Garcia, and Ascension Island. The monitor stations use a GPS receiver to passively track all satellites in view, accumulating ranging data from the satellites' signals. The information from the monitor stations is processed at the Master Control Station (MCS), located in Colorado Springs, CO, to determine satellite orbits and to update the navigation message of each satellite. The updated information is transmitted to the satellites via ground antennas. The ground antennas, located at Kwajelein, Diego Garcia, and Ascension Island, are also used for transmitting and receiving satellite control information.

(486) The User Segment consists of antennas and receiver-processors that provide positioning, velocity, and precise timing to the user. The GPS receiver makes time-of-arrival measurements of the satellite signals to obtain the distance between the user and the satellites. The distance calculations, known as pseudoranges, together with range rate information, are converted to yield system time and the user's three-dimensional position and velocity with respect to the satellite system. A time coordination factor then relates the satellite system to earth coordinates. A minimum of four pseudoranges are needed to produce a three-dimensional fix (latitude, longitude, and altitude). GPS receivers compute fix information in terms of the **World Geodetic System (1984)**, which may need datum shift correction before it can be accurately plotted on a chart. **There are three different types of receivers. Sequential** receivers track only one satellite at a time, computing a fix after a series of pseudoranges have been sequentially measured; these receivers are inexpensive but slow. **Continuous** receivers have at least four channels to process information from several satellites simultaneously; these process fix information the fastest. **Multiplex** receivers switch at a fast rate from satellite to satellite, receiving and processing data from several satellites simultaneously, producing a fix by a sort of "round-robin" process.

(487) GPS provides two services for position determination, **Standard Positioning Service (SPS)** and **Precise Positioning Service (PPS)**. Accuracy of a GPS fix varies with the capability of the user equipment. SPS is the standard level of positioning and timing accuracy that is available, without restrictions, to any user on a continuous worldwide basis. SPS provides positions with a horizontal accuracy of approximately 100 meters. PPS, limited to authorized users, provides horizontal accuracy of 30 meters or less.

(488) **Differential GPS (DGPS)**:

(489) The U.S. Coast Guard plans to provide a Differential GPS **(DGPS)** service for public use in all U.S. harbors and approach areas by 1996, including the Great Lakes, Puerto Rico, most of Alaska, and Hawaii. The system will provide radionavigational accuracy of 10 meters or less. DGPS reference stations will determine range errors and generate corrections for all GPS satellites in view. The DGPS signals will be broadcast using existing Coast Guard radiobeacons. Monitor stations will independently verify the quality of the DGPS broadcast. Until the system is declared operational by the Coast Guard, mariners are cautioned that signal availability and accuracy are subject to change due to the availability of GPS, testing of this developing service, and the unreliability of prototype equipment. For further information and/or operational questions regarding GPS or DGPS, contact:

(490) Commanding Officer

(491) U.S. Coast Guard Navigation Center
(492) 7323 Telegraph Road
(493) Alexandria, VA 22310-3998
(494) TEL: (703) 313-5900; FAX: (703) 313-5920;
(495) Electronic Bulletin Board Service (703) 313-5910; Email: NISWS@smtp.navcen.uscg.mil.

(496) **LORAN-C, GPS, DGPS, AND GENERAL RADIONAVIGATION USER INFORMATION.**–The Commandant of the U.S. Coast Guard has consolidated radionavigation operational control, management, and information responsibilities of the Commandant Radionavigation Division (G-NRN), Commander Atlantic Area (ATL), and Commander Pacific Area (PTL) at one field unit, entitled Navigation Center (NAVCEN). NAVCEN address:
(497) Commanding Officer
(498) USCG Navigation Center
(499) 7323 Telegraph Road
(500) Alexandria, VA 22310-3998.

(501) A reorganized G-NRN Staff remains at Coast Guard Headquarters for policy and planning functions of the radionavigation program.

(502) NAVCEN provides the following services:

(503) **Computer Bulletin Board (BBS)**: The BBS provides Loran-C, GPS, Marine Radiobeacon, Differential GPS (DGPS), and general radionavigation user information and status. It is accessed by computer users with modems. The Coast Guard does not charge for access to the BBS. Modem setup parameters: 8 bits, no parity, 1 stop; 300-14400 BAUD; call (703)313-5910.

(504) **GPS System**: Current status recorded voice announcements are available; phone (703) 313-5907. Printed materials on GPS may also be obtained; phone (703) 313-5900.

(505) **Loran-C information**: the current operational status of all Loran-C stations is available from the coordinator of chain operations (**COCO**) or the **Regional Manager**. The COCO monitors the day-to-day operations of the Loran-C chain and provides information with a recorded telephone announcement or responds to queries directed to the COCO personally. The Regional Managers monitor the operation of the Loran-C chains in their areas. Pertinent telephone numbers follow:

(506) COCO Canadian east coast (CEC-5930) and Labrador Sea (LABSEA-7930) chains is located at Loran Monitor Station St. Anthony Newfoundland Canada. Recorded announcement: (709) 454-3261. COCO: (709) 454-2392.

(507) COCO Great Lakes (GKLS-8970) and northeast US (NEUS-9960) chains is located at Loran Station Seneca, NY. Recorded announcement: (607) 869-5395. COCO: (607) 869-1334.

(508) COCO southeast US (SEUS-7980) and south central US (SOCUS-9310) chains is located at Loran Station Malone, FL. Recorded announcement: (205) 899-5227. COCO: (205) 899-5225/6.

(509) Information concerning the Gulf of Alaska (7960), Canadian west coast (5990), US west coast (9940), Russian-American (5980), North Pacific (9990), and North Central US (8290) chains may be obtained from the USCG Pacific Area Loran-C Regional Manager in Alameda, CA at (510) 437-3232.

(510) European Loran-C information:

(511) Information concerning the Icelandic (9980), Norwegian Sea (7970), and Mediterranean Sea (7990) chains may be obtained from the Regional Manager at U.S. Coast Guard Activities Europe, London, UK at 011-44-71-872-0943. If additional information is required after contacting COCO'S or the Pacific or European Regional Managers, contact the NAVCEN by calling (703) 313-5900 or by writing: Commanding Officer (OPS), NAVCEN (address above).

(512) Scheduled Loran-C unusable times are published by announcements in USCG Local Notice to Mariners, Canadian Coast Guard Notice to Shipping (NOTSHIP'S), FAA Notice to Airmen (NOTAMS), FAA NOTAM "D"s, and on the pre-recorded service for the pertinent chain. In many cases scheduled outages are preceded by Coast Guard Marine Radio Voice and NAVTEX Broadcasts in the areas where coverage will be affected.

(513) Military or government users with an official **Government Plain Language Address (PLAD)** desiring inclusion on notification messages should request such in writing to NAVCEN; address above. Requests must include a point of contact, telephone number, why you need this service, and a Government PLAD. Due to the time sensitive nature of this information it is sent only by government message. These messages and other Loran-C information are also available to the public in the Loran-C section of the NAVCEN Bulletin Board (BBS).

(514) If you have a problem with Loran, contact the applicable COCO or Regional Manager for the rate used. If you need to check about unusable time, system failures or report abnormalities, note the rate used, model of receiver, location, type of problem, date, and time occurred. This will enable the COCO or Regional Manager to quickly check the records for the period in question and to provide a more exact answer to you.

(515) **WWV and WWVH broadcasts**: Broadcasts from WWV of Fort Collins, CO and WWVH of Kekaha, Kauai, HI contain GPS information. Broadcasts are from WWV at 14 to 15 minutes after each hour and from WWVH at 43 to 44 minutes after each hour.

(516) U.S. **Naval Observatory**: The U.S. Naval Observatory (USNO) provides the following services: automated data services for Loran-C and GPS information: data service (menu driven) parameters - 8 bit, no parity, 1 stop, 1200 to 2400 BAUD, access password CESIUM133. Time service: (900) 410-8463 or (202) 762-1401. General information: (202) 762-1467.

(517) **National Oceanographic and Atmospheric Administration**: The U.S. Department of Commerce National Oceanographic and Atmospheric Administration (NOAA), Space Environment Services Center (SESC) disseminates information regarding solar activity, radio propagation, ionospheric, and geomagnetic conditions. For more information:

(518) For general information, and information about WWV and satellite broadcasts, write or call:
(519) U.S. Department of Commerce
(520) Space Environment Services Center, R/E/SE2
(521) 325 Broadway
(522) Boulder, CO 80303
(523) Telephone (303) 497-3171.

(524) **Uniform State Waterway Marking System.**–Many bodies of water used by boatmen are located entirely within the boundaries of a State. The Uniform State Waterway Marking System (USWMS) has been developed to indicate to the small-boat operator hazards, obstructions, restricted or controlled areas, and to provide directions. Although intended primarily for waters within the State boundaries, USWMS is suited for use in all water areas, since it supplements and is generally compatible with the Coast Guard lateral system of aids to navigation. The Coast Guard is gradually using more aids bearing the USWMS geometric shapes described below.

(525) Two categories of waterway markers are used. Regulatory markers, buoys, and signs use distinctive standard shape marks to show regulatory information. The signs are white with black let-

ters and have a wide orange border. They signify speed zones, restricted areas, danger areas, and directions to various places. Aids to navigation on State waters use red and black buoys to mark channel limits. Red and black buoys are generally used in pairs. The boat should pass between the red buoy and its companion black buoy. If the buoys are not placed in pairs, the distinctive color of the buoy indicates the direction of dangerous water from the buoy. White buoys with red tops should be passed to the S or W, indicating that danger lies to the N or E of the buoy. White buoys with black tops should be passed to the N or E. Danger lies to the S or W. Vertical red and white striped buoys indicate a boat should not pass between the buoy and the nearest shore. Danger lies inshore of the buoy.

## SPECIAL SIGNALS FOR CERTAIN VESSELS

(526) **Special signals for surveying vessels.**–National Oceanic and Atmospheric Administration (NOAA) vessels engaged in survey operations and limited in their ability to maneuver because of the work being performed (handling equipment over-the-side such as water sampling or conductivity-temperature-density (CTD) casts, towed gear, bottom samples, etc., and divers working on, below or in proximity of the vessel) are required by Navigation Rules, International-Inland, Rule 27, to exhibit:

(527) (b)(i) three all-round lights in a vertical line where they can best be seen. The highest and lowest of these lights shall be red and the middle light shall be white;

(528) (ii) three shapes in a vertical line where they can best be seen. The highest and lowest of these shapes shall be balls and the middle one a diamond;

(529) (iii) when making way through the water, masthead lights, sidelights and a sternlight, in addition to the lights prescribed in subparagraph (b)(i); and

(530) (iv) when at anchor, in addition to the lights or shapes prescribed in subparagraphs (b)(i) and (ii) the light, lights or shapes prescribed in Rule 30, Anchored Vessels and Vessels Aground.

(531) The color of the above shapes is black.

(532) A NOAA vessel engaged in hydrographic survey operations (making way on a specific trackline while sounding the bottom) is not restricted in its ability to maneuver and therefore exhibits at night only those lights required for a power-driven vessel of its length.

(533) **Warning signals for Coast Guard vessels while handling or servicing aids to navigation** are the same as those prescribed for surveying vessels. (See Special Signals for Surveying Vessels, this chapter.)

## NAVIGATION RESTRICTIONS AND REQUIREMENTS MARINE POLLUTION

(534) **Oil Pollution - Compliance with the Clean Water Act.**–The Federal Water Pollution Control Act (FWPCA) prohibits the discharge of quantities of either oil or hazardous substance which may be harmful into or upon the navigable waters of the United States. This prohibition also applies to adjoining shorelines, waters of the contiguous zone, activities connected with the Outer Continental Shelf Lands Act (OSLA) and Deepwater Port Act of 1974, and such discharges which may affect natural resources belonging to the United States or under its exclusive management authority, including those resources under the Fishery Conservation and Management Act of 1976. Furthermore, in the event a spill does occur in violation of the Act the person in charge of a vessel or onshore or offshore facility is required to notify the Coast Guard as soon as he has knowledge of the spill. Such notification is to be by the most rapid means available to the National Response Center (1-800-424-8802, nationwide 24 hour number).

(535) **Compliance with the Act to Prevent Pollution from Ships.**–The Act to Prevent Pollution from ships (33 U.S.C. 1901) implements into U.S. law the International Convention for the Prevention of Pollution from Ships, as modified by the Protocol of 1978 (MARPOL 73/78). Annex I of MARPOL 73/78 deals with oil and oily waste, Annex II with hazardous chemicals and other substances referred to as Noxious Liquid Substances (NLS), and Annex V deals with the prevention of marine pollution by plastics and other garbage produced during vessel operations.

(536) Annex I of MARPOL 73/78 is applicable to oceangoing tankers over 150 gross tons and all other oceangoing ships over 400 gross tons. The MARPOL 73/78 requirements include oily waste discharge limitations, oily-water separating equipment, monitoring and alarm systems for discharges from cargo areas, cargo pump rooms and machinery space bilges. Ships to which Annex I MARPOL 73/78 is applicable are also required to have an International Oil Pollution Prevention (IOPP) Certificate verifying that the vessel is in compliance with the requirements of MARPOL 73/78 and that any required equipment is on board and operational. Vessels must also maintain an Oil Record Book recording all oil transfers and discharges. The Oil Record Book is available from USCG Supply Center Baltimore or any local Captain of the Port.

(537) Annex II of MARPOL 73/78 is applicable to oceangoing vessels and non-self propelled oceangoing ships which carry Noxious Liquid Substances (NLS) in bulk. The Annex II requirements include discharge restrictions for various classes of cargo residues; the maintenance of a Cargo Record Book for recording all NLS cargo and residue transfers and discharges; and a Procedures and Arrangements Manual describing the correct procedures for off loading and prewashing cargo tanks.

(538) Annex II NLS cargoes are classified in one of four categories, A,B,C, or D. Category A is the most hazardous to the environment. Category A and other substances which tend to solidify in tanks must be prewashed in port under the supervision of a Prewash Surveyor prior to departure from the off loading terminal. Vessel discharges must be underwater when discharge at sea is allowed.Tanks which carry Category B and C NLS must be tested to ensure that after tank stripping only a minimal amount of residues will remain. Reception facilities must be able to assist in cargo stripping operations by reducing back pressure during the final stages of off loading.

(539) Terminals and ports receiving oceangoing tankers, or any other oceangoing ships of 400 GT or more, carrying residues and mixtures containing oil, or receiving oceangoing ships carrying NLSs, are required to provide adequate reception facilities for the wastes generated. Coast Guard Captains of the Port issue a Certificate of Adequacy to terminals or ports to show that they are in compliance with federal reception facility requirements. An oceangoing tanker or any other oceangoing ship of 400 GT or more required to retain oil or oily residues and mixtures on board and an oceangoing ship carrying a Category A, B or C NLS cargo or NLS residue in cargo tanks that are required to be prewashed, may not enter any port or terminal unless the port or terminal holds a valid Certificate of Adequacy or unless the ship is entering under force majeure.

(540) Annex V is applicable to all recreational, fishing, uninspected and inspected vessels, and foreign flag vessels on the navigable waters and all other waters subject to the jurisdiction of the

United States, out to and including the Exclusive Economic Zone (200 miles).

(541) Annex V prohibits the disposal of any and all plastic material from any vessel anywhere in the marine environment. Dunnage, lining and packing materials which float may be disposed of beyond 25 miles from the nearest land. Other garbage that will not float may be disposed of beyond 12 miles of land, except that garbage which can pass through a 25mm mesh screen (approximately 1 square inch) may be disposed of beyond 3 miles. Dishwater is not to be considered garbage within the meaning of Annex V when it is the liquid residue from the manual or automatic washing of dishes or cooking utensils. More restrictive disposal regimes apply in waters designated "Special Areas." This Annex requires terminals to provide reception facilities at ports and terminals to receive plastics and other garbage from visiting vessels.

(542) The civil penalty for each violation of MARPOL 73/78 is not more than $25,000. The criminal penalty for a person who knowingly violates the MARPOL Protocol, or the regulations (**33 CFR 151, 155, 157, and 158**), consists of a fine of not more than $250,000 and/or imprisonment for not more than 5 years; U.S. law also provides criminal penalties up to $500,000 against organizations which violate MARPOL.

(543) **Packaged Marine Pollutants-Complying with MARPOL Annex III**–On October 1, 1993, new regulations under the Hazardous Materials Transportation Act (HMTA) took effect, implementing MARPOL Annex III in the United States. MARPOL Annex III deals with the prevention of marine pollution by harmful substances in packaged form.

(544) Annex III of MARPOL 73/78 applies to all ships carrying harmful substances in packaged form. Annex III provides standards for stowage, packing, labeling, marking, and documentation of substances identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code). On 5 November 1992, the U.S. Research and Special Programs Administration (RSPA) amended the Hazardous Materials Regulations (HMR, 49 CFR 100-177) to list and regulate these marine pollutants in all modes of transportation. Under the HMR, marine pollutants are listed in a separate appendix, and a new "marine pollutant mark" will be required for those materials. The marine pollutant mark is used in addition to any existing labels or placards designating a hazardous substance.

(545) Marine pollutants are divided into two classes: marine pollutants and severe marine pollutants. A solution or mixture containing 10% or more of any marine pollutant falls into the class of "marine pollutant." The "severe marine pollutant" class consists of those materials that contain 1% or more of any specified "severe marine pollutant" substance. Marine pollutants that do not meet the criteria for any other hazard class are transported as an environmentally hazardous substance, solid or liquid, N.O.S. (class 9).

(546) **Pollution-Ocean Dumping.**–The Marine Protection Research and Sanctuaries Act of 1972, as amended (33 USC 1401 et seq.), regulates the dumping of all material, except fish waste, into ocean waters. Radiological, chemical and biological warfare agents and other high level radioactive wastes are expressly banned from ocean disposal. The U.S. Army Corps of Engineers issues permits for the disposal of dredged spoils; the Environmental Protection Agency is authorized to issue permits for all other dumping activities. Surveillance and enforcement to prevent unlawful transportation of material for dumping or unlawful dumping under the Act has been assigned to the U.S. Coast Guard. The Act provides civil penalties of up to $50,000 and criminal penalties of up to $50,000 and/or one year imprisonment.

(547) **Other requirements for the protection of navigable waters.**–It is not lawful to tie up or anchor vessels or to float lografts in navigable channels in such manner as to obstruct normal navigation. When a vessel or raft is wrecked and sunk in a navigable channel it is the duty of the owner to immediately mark it with a buoy or beacon during the day and a light at night until the sunken craft is removed or abandoned.

(548) **Obligation of deck officers.**–Licensed deck officers are required to acquaint themselves with the latest information published in Notice to Mariners regarding aids to navigation.

(549) **Improper use of searchlights prohibited.**–No person shall flash or cause to be flashed the rays of a searchlight or other blinding light onto the bridge or into the pilothouse of any vessel underway. The International Code Signal "PG2" may be made by a vessel inconvenienced by the glare of a searchlight in order to apprise the offending vessel of the fact.

(550) **Use of Radar.**–Navigation Rules, International-Inland, Rule 7, states, in part, that every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt, such risk shall be deemed to exist. Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

(551) This rule places an additional responsibility on vessels which are equipped and manned to use radar to do so while underway during periods of reduced visibility without in any way relieving commanding officers of the responsibility of carrying out normal precautionary measures.

(552) Navigation Rules, International-Inland, Rules 6, 7, 8, and 19 apply to the use of radar.

(553) **Danger signal.**–Navigation Rules, International-Inland, Rule 34(d), states that when vessels in sight of one another are approaching each other and from any cause either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other to avoid collision, the vessel in doubt shall immediately indicate such doubt by giving at least five short and rapid blasts on the whistle. Such signal may be supplemented by a light signal of at least five short and rapid flashes.

(554) **Narrow channels.**–Navigation Rules, International-Inland, Rule 9(b) states: A vessel of less than 65.6 feet (20 meters) in length or a sailing vessel shall not impede the passage of a vessel that can safely navigate only within a narrow channel or fairway.

(555) **Control of shipping in time of emergency or war.**–In time of war or national emergency, merchant vessels of the United States and those foreign flag vessels, which are considered under effective U.S. control, will be subject to control by agencies of the U.S. Government. The allocation and employment of such vessels, and of domestic port facilities, equipment, and services will be performed by appropriate agencies of the War Transport Administration. The movement, routing, and diversion of merchant ships at sea will be controlled by appropriate naval commanders. The movement of merchant ships within domestic ports and dispersal anchorages will be coordinated by the U.S. Coast Guard. The commencement of naval control will be signalled by a general emergency message. (See NIMA Pub. 117 for emergency procedures and communication instructions.)

(556) **U.S. Fishery Conservation Zone.**–The United States exercises exclusive fishery management authority over all species of fish, except tuna, within the fishery conservation zone, whose

seaward boundary is 200 miles from the baseline from which the U.S. territorial sea is measured; all anadromous species which spawn in the United States throughout their migratory range beyond the fishery conservation zone, except within a foreign country's equivalent fishery zone as recognized by the United States; all U.S. Continental Shelf fishery resources beyond the fishery conservation zone. Such resources include American lobster and species of coral, crab, abalone, conch, clam, and sponge, among others.

(557) No foreign vessel may fish, aid, or assist vessels at sea in the performance of any activity relating to fishing including, but not limited to, preparation, supply, storage, refrigeration, transportation, or processing, within the fishery conservation zone, or fish for anadromous species of the United States or Continental Shelf fishery resources without a permit issued in accordance with U.S. law. These permits may only be issued to vessels from countries recognizing the exclusive fishery management authority of the United States in an international agreement. The owners or operators of foreign vessels desiring to engage in fishing off U.S. coastal waters should ascertain their eligibility from their own flag state authorities. Failure to obtain a permit prior to fishing, or failure to comply with the conditions and restrictions established in the permit may subject both vessel and its owners or operators to administrative, civil, and criminal penalties. (Further details concerning foreign fishing are given in **50 CFR 611**.)

(558) Reports of foreign fishing activity within the fishery conservation zone should be made to the U.S. Coast Guard. Immediate reports are particularly desired, but later reports by any means also have value. Reports should include the activity observed, the position, and as much identifying information (name, number, homeport, type, flag, color, size, shape, etc.) about the foreign vessel as possible, and the reporting party's name and address or telephone number.

(559) **Bridge-to-Bridge Radiotelephone Communication.**–Voice radio bridge-to-bridge communication between vessels is an effective aid in the prevention of collisions where there is restricted maneuvering room and/or visibility. VHF-FM radio is used for this purpose due to its essentially line-of-sight characteristic and relative freedom from static. As VHF-FM has increasingly come into use for short-range communications in U.S. harbors and other high-traffic waters, so has the number of ships equipped with this gear increased.

(560) The Vessel Bridge-to-Bridge Radiotelephone Regulations, effective January 1, 1973, require vessels subject to the Act while navigating to be equipped with at least one single channel transceiver capable of transmitting and receiving on VHF-FM channel 13, the Bridge-to-Bridge Radiotelephone frequency. Vessels with multichannel equipment are required to have an additional receiver so as to be able to guard VHF-FM channel 13, the Bridge-to-Bridge Radiotelephone frequency, in addition to VHF-FM channel 16, the National Distress, Safety, and Calling frequency required by Federal Communications Commission regulations. (See **33 CFR 26.01 through 26.10,** chapter 2, for Vessel Bridge-to-Bridge Radiotelephone Regulations.)

(561) Vessels operating on the Great Lakes and certain connecting and tributary waters are subject to the provisions of the Great Lakes Radio Agreement between the United States and Canada. (See **47 CFR 83.536 through 83.550,** chapter 2, for regulations.)

(562) Mariners are reminded that the use of bridge-to-bridge voice communications in no way alters the obligation to comply with the provisions of the Navigation Rules, International-Inland.

(563) **VHF-FM Radiotelephone.**–VHF-FM channel 16 (156.800 MHz) is the international distress, urgency, safety, calling and reply frequency for vessels, public and private coastal stations. In 1992, the Federal Communications Commission (FCC) designated VHF-FM channel 9 (156.450 MHz) for use as a general purpose calling frequency for non-commercial vessels, such as recreational boats. This move was designed to relieve congestion on VHF-FM channel 16. Non-commercial vessels are encouraged to use VHF-FM channel 9 for routine communications but distress, urgency, and safety calls should continue to be initially made on VHF-FM channel 16.

(564) The following table provides the frequency equivalents and general usage of selected VHF-FM channels which appear in the Coast Pilot. The letter "A" appended to a channel number indicates that U.S. operation of the particular channel is different than the international operation, i.e., U.S. stations transmit and receive on the same frequency and international stations use different frequencies.

(565) The information given here is extracted from the "Maritime Radio Users Handbook" published by the Radio Technical Commission for Maritime Services. Ordering information for this valuable, comprehensive publication is included in the appendix.

(566) All channels given below are designated for both ship-to-ship and ship-to-coast communications except as noted.

| VHF Channel | Ship Frequency (MHz) | | Channel Usage |
|---|---|---|---|
| | Transmit | Receive | |
| 1A | 156.050 | 156.050 | Port Operations and Commercial, VTS. (see footnote 2) |
| 5A | 156.250 | 156.250 | Port Operations or VTS. (see footnote 1) |
| 6 | 156.300 | 156.300 | Intership Safety |
| 7A | 156.350 | 156.350 | Commercial |
| 8 | 156.400 | 156.400 | Commercial (Intership only) |
| 9 | 156.450 | 156.450 | Boater Calling. Commercial/Non-commercial |
| 10 | 156.500 | 156.500 | Commercial |
| 11 | 156.550 | 156.550 | Commercial. VTS in selected areas. |
| 12 | 156.600 | 156.600 | Port operations. VTS in selected areas. |
| 13 | 156.650 | 156.650 | Intership Navigation Safety (Bridge-to-bridge). (see footnote 4) |
| 14 | 156.700 | 156.700 | Port Operations. VTS in selected areas. |
| 15 | ..... | 156.750 | Environmental (Receive only). Used by Class C EPIRBs. |
| 16 | 156.800 | 156.800 | International Distress, Safety and Calling. (see footnote 5) |
| 17 | 156.850 | 156.850 | State Control |
| 18A | 156.900 | 156.900 | Commercial |
| 19A | 156.950 | 156.950 | Commercial |
| 20 | 157.000 | 161.600 | Port Operations (duplex) |
| 20A | 157.000 | 157.000 | Port Operations |
| 21A | 157.050 | 157.050 | U.S. Coast Guard only |
| 22A | 157.100 | 157.100 | Coast Guard Liaison/Maritime Safety Information Broadcasts. Channel 16) |
| 23A | 157.150 | 157.150 | U.S. Coast Guard only |
| 24 | 157.200 | 161.800 | Public Correspondence (Marine Operator) |
| 25 | 157.250 | 161.850 | Public Correspondence (Marine Operator) |
| 26 | 157.300 | 161.900 | Public Correspondence (Marine Operator) |
| 27 | 157.350 | 161.950 | Public Correspondence (Marine Operator) |
| 28 | 157.400 | 162.000 | Public Correspondence (Marine Operator) |
| 63A | 156.175 | 156.175 | Port Operations and Commercial, VTS. (see footnote 2) |
| 65A | 156.275 | 156.275 | Port Operations |
| 66A | 156.325 | 156.325 | Port Operations |
| 67 | 156.375 | 156.375 | Commercial. (see footnote 3) |
| 68 | 156.425 | 156.425 | Non-Ccommercial |
| 69 | 156.475 | 156.475 | Non-Commercial |
| 70 | 156.525 | 156.525 | Digital Selective Calling (voice communications not allowed) |
| 71 | 156.575 | 156.575 | Non-Commercial |
| 72 | 156.625 | 156.625 | Non-Commercial (Intership only) |
| 73 | 156.675 | 156.675 | Port Operations |
| 74 | 156.725 | 156.725 | Port Operations |
| 77 | 156.875 | 156.875 | Port Operations (Intership only) |
| 78A | 156.925 | 156.925 | Non-commercial |
| 79A | 156.975 | 156.975 | Commercial. Non-Commercial in Great Lakes only |
| 80A | 157.025 | 157.025 | Commercial. Non-Commercial in Great Lakes only |

| VHF Channel | Ship Frequency (MHz) | | Channel Usage |
|---|---|---|---|
| | Transmit | Receive | |
| 81A | 157.075 | 157.075 | U.S. Government only-Environmental protection operations |
| 82A | 157.125 | 157.125 | U.S. Government only |
| 83A | 157.175 | 157.175 | U.S. Coast Guard only |
| 84 | 157.225 | 161.825 | Public Correspondence (Marine Operator) |
| 85 | 157.275 | 161.875 | Public Correspondence (Marine Operator) |
| 86 | 157.325 | 161.925 | Public Correspondence (Marine Operator) |
| 87 | 157.375 | 161.975 | Public Correspondence (Marine Operator) |
| 88 | 157.425 | 162.025 | Public Correspondence only near Canadian border. |
| 88A | 157.425 | 157.425 | Commercial, Intership only |

**Footnotes to table:**

1. Houston, New Orleans and Seattle areas
2. Available only in New Orleans/Lower Mississippi area
3. Used for Bridge-to-bridge communications in Lower Mississippi River. Intership only.
4. Ships >20m length maintain a listening watch on this channel in US waters.
5. Ships required to carry radio, USCG, and most coast stations maintain a listening watch on this channel.

## CANADIAN GOVERNMENT AGENCIES PROVIDING MARITIME SERVICES

(567) **Canadian Coast Guard,** Department of Transport, is charged with the responsibility for the safe navigation of vessels in Canadian waters. The Coast Guard maintains aids to navigation, operates maritime radio stations, operates weather and survey vessels, conducts marine research and icebreaking operations, lays and repairs submarine cables, and performs many of the same duties as its U.S. counterpart.

(568) The Canadian Coast Guard carries out duties as the marine element of the Canadian Armed Forces search and rescue organization. In Canadian waters of the Great Lakes, search and rescue activities are controlled by a Rescue Coordination Center at Trenton, Ont. The center is alerted by Canadian Coast Guard radio stations or search and rescue units immediately upon receipt of a distress signal.

(569) The Canadian Coast Guard publishes annually the Canadian Lists of Lights, Buoys, and Fog Signals. Radio Aids to Marine Navigation (issued March 1, June 1, and September 1 of each year), Notice to Mariners, Radio Broadcast Notice to Mariners, and Notices to Shipping are also issued by the Canadian Coast Guard.

(570) Lists of Lights, Buoys, and Fog Signals and Radio Aids to Marine Navigation are available from Canadian Hydrographic Chart Distribution Office. Notices to Mariners are available from Director, Aids and Waterways, Canadian Coast Guard. Notices to Shipping are broadcast from Canadian Coast Guard radio stations; those in effect for an extended time are published in the form of a circular available from the Canadian Coast Guard Traffic Centre. (See appendix for addresses.)

(571) **Canadian Hydrographic Service,** Department of Fisheries and Oceans, publishes nautical charts and other related marine publications, Canadian Sailing Directions (including Great Lakes, Volumes I and II, and Gulf and River St. Lawrence), Small Craft Guides, and the Catalogs of Nautical Charts and Related Publications. These publications are available from the Canadian Hydrographic Chart Distribution Office. (See appendix for addresses.)

(572) The Canadian Hydrographic Service, in conjunction with other components of the Department of Fisheries and Oceans and the Department of the Environment, provides data for several periodic bulletins containing water level information, including the Water Levels-Daily Means, and the Monthly Water Level Bulletin, Great Lakes and Montreal Harbour. These publications are available from Canadian Hydrographic Chart Distribution Office. (See appendix for addresses.)

(573) **Canadian source.**–In this publication information quoted from a Canadian source is printed verbatim in italics.

# 2. NAVIGATION REGULATIONS

(1) This chapter contains extracts from **Code of Federal Regulations (CFR)** that are of importance to mariners in the area covered by this Coast Pilot. The following titles have extracts contained in this chapter.

(2) **Title 21**, Food and Drugs,

(3) **Title 33**, Navigation and Navigable Waters,

(4) **Title 36**, Parks, Forests, and Public Property,

(5) **Title 40**, Protection of Environment,

(6) **Title 46**, Shipping, and

(7) **Title 47**, Telecommunications.

(8) The following Parts of the above Titles (the part number is the suffix on the CFR) have extracts contained in this chapter:

(9) **21 CFR 1250**, Interstate Conveyance Sanitation,

(10) **33 CFR 26**, Vessel Bridge-to-Bridge Radiotelephone Regulations,

(11) **33 CFR 110**, Anchorage Regulations,

(12) **33 CFR 117**, Drawbridge Operation Regulations,

(13) **33 CFR 151**, Vessels Carrying Oil, Noxious Liquid Substances, Garbage, Municipal or Commercial Waste, and Ballast Water,

(14) **33 CFR 160**, Ports and Waterways Safety,

(15) **33 CFR 161**, Vessel Traffic Management,

(16) **33 CFR 162**, Inland Waterways Navigation Regulations,

(17) **33 CFR 164**, Navigation Safety Regulations,

(18) **33 CFR 165**, Regulated Navigation Areas and Limited Access Areas,

(19) **33 CFR 207**, Navigation Regulations,

(20) **33 CFR 334**, Danger Zone and Restricted Area Regulations,

(21) **33 CFR 401**, Seaway Regulations and Rules (actually the source is identified, only),

(22) **36 CFR 7**, Special Regulations, Areas of the National Park System,

(23) **40 CFR 140**, Marine Sanitation Device Standard,

(24) **46 CFR 401**, Great Lakes Pilotage Regulations, and

(25) **47 CFR 80**, Stations in the Maritime Services.

(26) Certain Canadian Government regulations are contained at the end of this chapter.

(27) **Note.**–These regulations can only be amended by the enforcing agency or other authority cited in the regulations. Accordingly, requests for changes to these regulations should be directed to the appropriate agency for action. In those regulations where the enforcing agency is not cited or is unclear, recommendations for changes should be directed to the following Federal agencies for action: Food and Drug Administration (21 CFR 1250); U.S. Coast Guard (33 CFR 26, 110, 117, 160, 161, 162, 164, and 165; 46 CFR 401); U.S. Army Corps of Engineers (33 CFR 207 and 334); Saint Lawrence Seaway Development Corporation (33 CFR 401); National Park Service (36 CFR 1, 2, and 7); Environmental Protection Agency (40 CFR 140); Federal Communications Commission (47 CFR 80).

(28) **Title 21–Food and Drugs**

**Part 1250–Interstate Conveyance Sanitation**

(29) **§1250.93 Discharge of Wastes.** Vessels operating on freshwater lakes or rivers shall not discharge sewage, or ballast or bilge water, within such areas adjacent to domestic water intakes as are designated by the Commissioner of Food and Drugs.

(30) **Title 33–Navigation and Navigable Waters**

**Part 26–Vessel Bridge-to-Bridge Radiotelephone Regulations**

(31) **§26.01 Purpose.**

(32) (a) The purpose of this part is to implement the provisions of the Vessel Bridge-to-Bridge Radiotelephone Act. This part–

(33) (1) Requires the use of the vessel bridge-to-bridge radiotelephone;

(34) (2) Provides the Coast Guard's interpretation of the meaning of important terms in the Act;

(35) (3) Prescribes the procedures for applying for an exemption from the Act and the regulations issued under the Act and a listing of exemptions.

(36) (b) Nothing in this part relieves any person from the obligation of complying with the rules of the road and the applicable pilot rules.

(37) **§26.02 Definitions.**

(38) For the purpose of this part and interpreting the Act–

(39) "Secretary" means the Secretary of the Department in which the Coast Guard is operating;

(40) "Act" means the "Vessel Bridge-to-Bridge Radiotelephone Act", 33 U.S.C. section 1201-1208;

(41) "Length" is measured from end to end over the deck excluding sheer;

(42) "Power-driven vessel" means any vessel propelled by machinery; and

(43) "Towing vessel" means any commercial vessel engaged in towing another vessel astern, alongside, or by pushing ahead.

(44) "Vessel Traffic Services (VTS)" means a service implemented under Part 161 of this chapter by the United States Coast Guard designed to improve the safety and efficiency of vessel traffic and to protect the environment. The VTS has the capability to interact with marine traffic and respond to traffic situations developing in the VTS area.

(45) "Vessel Traffic Service Area or VTS Area" means the geographical area encompassing a specific VTS area of service as described in Part 161 of this chapter. This area of service may be subdivided into sectors for the purpose of allocating responsibility to individual Vessel Traffic Centers or to identify different operating requirements.

(46) **Note:** Although regulatory jurisdiction is limited to the navigable waters of the United States, certain vessels will be encouraged or may be required, as a condition of port entry to report beyond this area to facilitate traffic management within the VTS area.

(47) **§26.03 Radiotelephone required.**

(48) (a) Unless an exemption is granted under §26.09 and except as provided in paragraph (a)(4) of this section, this part applies to:

(49) (1) Every power-driven vessel of 20 meters or over in length while navigating:

(50) (2) Every vessel of 100 gross tons upward carrying one or more passengers for hire while navigating;

(51) (3) Every towing vessel of 26 feet or over in length while navigating; and

(52) (4) Every dredge and floating plant engaged in or near a channel or fairway in operations likely to restrict or affect navigation of other vessels except for an unmanned or intermittently manned floating plant under the control of a dredge.

(53) (b) Every vessel, dredge, or floating plant described in paragraph (a) of this section must have a radiotelephone on board capable of operation from its navigational bridge, or in the case of a dredge, from its main control station, and capable of transmitting and receiving on the frequency or frequencies within the 156-162 Mega-Hertz band using the classes of emissions designated by the Federal Communications Commission for the exchange of navigational information.

(54) (c) The radiotelephone required by paragraph (b) of this section must be carried on board the described vessels, dredges, and floating plants upon the navigable waters of the United States.

(55) (d) The radiotelephone required by paragraph (b) of this section must be capable of transmitting and receiving on VHF FM channel 22A (157.1 MHz).

(56) (e) While transiting any of the following waters, each vessel described in paragraph (a) of this section also must have on board a radiotelephone capable of transmitting and receiving on VHF FM channel 67 (156.375 MHz):

(57) (1) The lower Mississippi River from the territorial sea boundary, and within either the Southwest Pass safety fairway or the South Pass safety fairway specified in 33 CFR 166.200, to mile 242.4 AHP (Above Head of Passes) near Baton Rouge;

(58) (2) The Mississippi River-Gulf Outlet from the territorial sea boundary, and within the Mississippi River-Gulf Outlet Safety Fairway specified in 33 CFR 166.200, to that channel's junction with the Inner Harbor Navigation Canal; and

(59) (3) The full length of the Inner Harbor Navigation Canal from its junction with the Mississippi River to that canal's entry to Lake Pontchartrain at the New Seabrook vehicular bridge.

(60) (f) In addition to the radiotelephone required by paragraph (b) of this section, each vessel described in paragraph (a) of this section while transiting any waters within a Vessel Traffic Service Area, must have on board a radiotelephone capable of transmitting and receiving on the VTS designated frequency in Table 26.03(f) (VTS Call Signs, Designated Frequencies, and Monitoring Areas).

(61) **Note:** A single VHF-FM radio capable of scanning or sequential monitoring (often referred to as "dual watch" capability) will not meet the requirements for two radios.

(62) **§26.04 Use of the designated frequency.**

(63) (a) No person may use the frequency designated by the Federal Communications Commission under section 8 of the Act, 33 U.S.C. 1207(a), to transmit any information other than information necessary for the safe navigation of vessels or necessary tests.

(64) (b) Each person who is required to maintain a listening watch under section 5 of the Act shall, when necessary, transmit and confirm, on the designated frequency, the intentions of his vessel and any other information necessary for the safe navigation of vessels.

(65) (c) Nothing in these regulations may be construed as prohibiting the use of the designated frequency to communicate with shore stations to obtain or furnish information necessary for the safe navigation of vessels.

(66) (d) On the navigable waters of the United States, channel 13 (156.65 MHz) is the designated frequency required to be monitored in accordance with §26.05(a) except that in the area prescribed in §26.03(e), channel 67 (156.375 MHz) is the designated frequency.

(67) (e) On those navigable waters of the United States within a VTS area, the designated VTS frequency is an additional designated frequency required to be monitored in accordance with §26.05.

(68) **Note:** As stated in 47 CFR 80.148(b), a VHF watch on Channel 16 (156.800 MHz) is not required on vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act and participating in a Vessel Traffic Service (VTS) system when the watch is maintained on both the vessel bridge-to-bridge frequency and a designated VTS frequency.

(69) **§26.05 Use of radiotelephone.**

(70) Section 5 of the Act states that the radiotelephone required by this Act is for the exclusive use of the master or person in charge of the vessel, or the person designated by the master or person in charge to pilot or direct the movement of the vessel, who shall maintain a listening watch on the designated frequency. Nothing herein shall be interpreted as precluding the use of portable radiotelephone equipment to satisfy the requirements of this act.

(71) **§26.06 Maintenance of radiotelephone; failure of radiotelephone.**

(72) Section 6 of the Act states–

(73) (a) Whenever radiotelephone capability is required by this Act, a vessel's radiotelephone equipment shall be maintained in effective operating condition. If the radiotelephone equipment carried aboard a vessel ceases to operate, the master shall exercise due diligence to restore it or cause it to be restored to effective operating condition at the earliest practicable time. The failure of a vessel's radiotelephone equipment shall not, in itself, constitute a violation of this Act, nor shall it obligate the master of any vessel to moor or anchor his vessel; however, the loss of radiotelephone capability shall be given consideration in the navigation of the vessel.

(74) **§26.07 Communications.**

(75) No person may use the services of, and no person may serve as, a person required to maintain a listening watch under section 5 of the Act, 33 U.S.C. 1204 unless the person can communicate in the English language.

(76) **§26.08 Exemption procedures.**

(77) (a) The Commandant has redelegated to the Assistant Commandant for Marine Safety and Environmental Protection, U.S. Coast Guard Headquarters, with the reservation that this authority shall not be further redelegated, the authority to grant exemptions from provisions of the Vessel Bridge-to-Bridge Radiotelephone Act and this part.

(78) (b) Any person may petition for an exemption from any provision of the Act or this part;

(79) (c) Each petition must be submitted in writing to U.S. Coast Guard, Marine Safety and Environmental Protection, 2100 Second Street SW., Washington, DC 20593–0001, and must state:

(80) (1) The provisions of the Act or this part from which an exemption is requested; and

(81) (2) The reasons why marine navigation will not be adversely affected if the exemption is granted and if the exemption relates to a local communication system how that system would

## Table 26.03(f)—VESSEL TRAFFIC SERVICES (VTS) CALL SIGNS, DESIGNATED FREQUENCIES, AND MONITORING AREAS

| Vessel traffic services[1] (call sign) | Designated frequency[2] (channel designation) | Monitoring area |
|---|---|---|
| | | **New York[3]** |
| New York Traffic[4] ..... | 156.550 MHz (Ch. 11) and 156.700 MHz (Ch. 14) .... | The navigable waters of the Lower New York Harbor bounded on the east by a line drawn from Norton Point to Breezy Point; on the south by a line connecting the entrance buoys at the Ambrose Channel, Swash Channel and Sandy Hook Channel to Sandy Hook Point; and on the southeast including the waters of the Sandy Hook Bay south to a line drawn at 40°25′N.; then west into waters of the Raritan Bay to the Raritan River Rail Road Bridge; and then north including the waters of the Arthur Kill and Newark Bay to the Lehigh Valley Draw Bridge at 40°41.95′N.; and then east including the waters of the Kill Van Kull and Upper New York Bay north to a line drawn east-west from the Holland Tunnel Ventilator Shaft at 40°43.7′N., 74°01.6′W. in the Hudson River; and continuing east including the waters of the East River to the Throgs Neck Bridge, excluding the Harlem River. |
| | 156.600 MHz (Ch. 12) .... | Each vessel at anchor within the above areas. |
| | | **Houston[3]** |
| Houston Traffic..... | 156.550 MHz (Ch. 11)..... | The navigable waters north of 29°N., west of 94°20′W., south of 29°49′N., and east of 95°20′W.: The navigable waters north of a line extending due west from the southernmost end of Exxon Dock #1 (29°43.37′N., 95°01.27′W.) |
| | 156.600 MHz (Ch 12)..... | The navigable waters south of a line extending due west from the southernmost end of Exxon Dock #1 (29°43.37′N., 95°01.27′W.). |
| | | **Berwick Bay** |
| Berwick Traffic..... | 156.550 MHz (Ch. 11)..... | The navigable waters south of 29°45′N., west of 91°10′W., north of 29°37′N., and east of 91°18′W. |
| | | **St. Marys River** |
| Soo Control ..... | 156.600 MHz (Ch. 12) .... | The navigable waters of the St. Marys River between 45°57′N. (De Tour Reef Light) and 46°38.7′N. (Ile Parisienne Light), except the St. Marys Falls Canal and those navigable waters east of a line from 46°04.16′N. and 46°01.57′N. (La Pointe to Sims Point in Potagannissing Bay and Worsley Bay). |
| | | **San Francisco[3]** |
| San Francisco Offshore Vessel Movement. | 156.600 MHz (Ch. 12) .... | The waters within a 38 nautical mile radius of Mount Tamalpais (37°55.8′N., 122°34.6′W.) excluding the San Francisco Offshore Precautionary Area. |
| Reporting Service San Francisco Traffic. | 156.700 MHz (Ch. 14) .... | The waters of the San Francisco Offshore Precautionary Area eastward to San Francisco Bay including its tributaries extending to the ports of Stockton, Sacramento and Redwood City. |

| Vessel traffic services[1] (call sign) | Designated frequency[2] (channel designation) | Monitoring area |
|---|---|---|
| | **Puget Sound[5]** | |
| Seattle Traffic[6] ..... | 156.700 MHz (Ch. 14)..... | The navigable waters of Puget Sound, Hood Canal and adjacent waters south of a line connecting Marrowstone Point and Lagoon Point in Admiralty Inlet and south of a line drawn due east from the southernmost tip of Possession Point on Whidbey Island to the shoreline. |
| | 156.250 MHz (Ch. 5A) .... | The navigable waters of the Strait of Juan de Fuca east of 124°40′W. excluding the waters in the central portion of the Strait of Juan de Fuca north and east of Race Rocks; the navigable waters of the Strait of Georgia east of 122°52′W.; the San Juan Island Archipelago, Rosario Strait, Bellingham Bay; Admiralty Inlet north of a line connecting Marrowstone Point and Lagoon Point and all waters east of Whidbey Island north of a line drawn due east from the southernmost tip of Possession Point on Whidbey Island to the shoreline. |
| Tofino Traffic[7]..... | 156.725 MHz (Ch. 74)..... | The waters west of 124°40′W. within 50 nautical miles of the coast of Vancouver Island including the waters north of 48°N., and east of 127°W. |
| Vancouver Traffic ..... | 156.550 MHz (Ch. 11)..... | The navigable waters of the Strait of Georgia west of 122°52′W., the navigable waters of the central Strait of Juan de Fuca north and east of Race Rocks, including the Gulf Island Archipelago, Boundary Pass and Haro Strait. |
| | **Prince William Sound[8]** | |
| Valdez Traffic ..... | 156.650 MHz (Ch. 13)..... | The navigable waters south of 61°05′N., east of 147°20′W., north of 60°N., and west of 146°30′W.; and, all navigable waters in Port Valdez. |
| | **Louisville[8]** | |
| Louisville Traffic..... | 156.650 MHz (Ch. 13)..... | The navigable waters of the Ohio River between McAlpine Locks (Mile 606) and Twelve Mile Island (Mile 593), only when the McAlpine upper pool gauge is at approximately 13.0 feet or above. |

**NOTES:**

[1] VTS regulations are denoted in 33 CFR Part 161. All geographic coordinates (latitude and longitude) are expressed in North American Datum of 1983 (NAD 83).

[2] In the event of a communication failure either by the vessel traffic center or the vessel or radio congestion on a designated VTS frequency, communications may be established on an alternate VTS frequency. The bridge-to-bridge navigational frequency, 156.650 MHz (Channel 13), is monitored in each VTS area; and it may be used as an alternate frequency, however, only to the extent that doing so provides a level of safety beyond that provided by other means.

[3] Designated frequency monitoring is required within U.S. navigable waters. In areas which are outside the U.S. navigable waters, designated frequency monitoring is voluntary. However, prospective VTS Users are encouraged to monitor the designated frequency.

[4] VMRS participants shall make their initial report (Sail Plan) to New York Traffic on Channel 11 (156.550 MHz). All other reports, including the Final Report, shall be made on Channel 14 (156.700 MHz). VMRS and other VTS Users shall monitor Channel 14 (156.700 MHz) while transiting the VTS area. New York Traffic may direct a vessel to monitor and report on either primary frequency depending on traffic density, weather conditions, or other safety factors. This does not require a vessel to monitor both primary frequencies.

[5] A Cooperative Vessel Traffic Service was established by the United States and Canada within adjoining waters. The appropriate vessel traffic center administers the rules issued by both nations; however, it will enforce only its own set of rules within its jurisdiction.

[6] Seattle Traffic may direct a vessel to monitor the other primary VTS frequency 156.250 MHz or 156.700 MHz (Channel 5A or 14) depending on traffic density, weather conditions, or other safety factors, rather than strictly adhering to the designated frequency required for each monitoring area as defined above. This does not require a vessel to monitor both primary frequencies.

[7] A portion of Tofino Sector's monitoring area extends beyond the defined CVTS area. Designated frequency monitoring is voluntary in these portions outside of VTS jurisdiction, however, prospective VTS Users are encouraged to monitor the designated frequency.

[8] The bridge-to-bridge navigational frequency, 156.650 MHz (Channel 13), is used in these VTSs because the level of radiotelephone transmissions does not warrant a designated VTS frequency. The listening watch required by §26.05 of this chapter is not limited to the monitoring area.

fully comply with the intent of the concept of the Act but would not conform in detail if the exemption is granted.

(82) **§26.09 List of exemptions.**

(83) (a) All vessels navigating on those waters governed by the navigation rules for Great Lakes and their connecting and tributary waters (33 U.S.C. 241 et seq.) are exempt from the requirements of the Vessel Bridge-to-Bridge Radiotelephone Act and this part until May 6, 1975.

(84) (b) Each vessel navigating on the Great Lakes as defined in the Inland Navigational Rules Act of 1980 (33 U.S.C. 2001 et seq.) and to which the Vessel Bridge-to-Bridge Radiotelephone Act (33 U.S.C. 1201-1208) applies is exempt from the requirements in 33 U.S.C. 1203, 1204, and 1205 and the regulations under §§26.03, 26.04, 26.05, 26.06, and 26.07. Each of these vessels and each person to whom 33 U.S.C. 1208(a) applies must comply with Articles VII, X, XI, XII, XIII, XV, and XVI and Technical Regulations 1-9 of "The Agreement Between the United States of America and Canada for Promotion of Safety on the Great Lakes by Means of Radio, 1973."

(85) **§26.10 Penalties.**

(86) Section 9 of the Act states–

(87) (a) Whoever, being the master or person in charge of a vessel subject to the Act, fails to enforce or comply with the Act or the regulations hereunder; or whoever, being designated by the master or person in charge of a vessel subject to the Act to pilot or direct the movement of a vessel fails to enforce or comply with the Act or the regulations hereunder-is liable to a civil penalty of not more than $500 to be assessed by the Secretary.

(88) (b) Every vessel navigated in violation of the Act or the regulations hereunder is liable to a civil penalty of not more than $500 to be assessed by the Secretary, for which the vessel may be proceeded against in any District Court of the United States having jurisdiction.

(89) (c) Any penalty assessed under this section may be remitted or mitigated by the Secretary, upon such terms as he may deem proper.

**Part 110–Anchorage Regulations**

(90) **§110.1 General.**

(91) (a) The areas described in subpart A of this part are designated as special anchorage areas for purposes of 33 U.S.C. §§2030(g) and 2035(j). Vessels of less than 20 meters in length, and barges, canal boats, scows, or other nondescript craft, are not required to sound signals required by rule 35 of the Inland Navigation Rules (33 U.S.C. 2035). Vessels of less than 20 meters are not required to exhibit anchor lights or shapes required by rule 30 of the Inland Navigation Rules (33 U.S.C. 2030).

(92) (b) The anchorage grounds for vessels described in Subpart B of this part are established, and the rules and regulations in relation thereto adopted, pursuant to the authority contained in section 7 of the act of March 4, 1915, as amended (38 Stat. 1053; 33 U.S.C. 471).

(93) (c) All bearings in the part are referred to true meridian.

(94) (d) Geographic coordinates expressed in terms of latitude or longitude, or both, are not intended for plotting on maps or charts whose referenced horizontal datum is the North American Datum of 1983 (NAD 83), unless such geographic coordinates are expressly labeled NAD 83. Geographic coordinates without the NAD 83 reference may be plotted on maps or charts referenced to NAD 83 only after application of the appropriate corrections that are published on the particular map or chart being used.

**Subpart A–Special Anchorage Areas**

(95) **§110.8 Lake Champlain, N.Y. and Vt.**

(96) (a) Ticonderoga, N.Y. An area shoreward of a line bearing 312° from Ticonderoga Light to the southeast corner of the New York State Boat Launching Ramp.

(97) (b) Essex, N.Y. A small cove at the westerly side of Lake Champlain, shoreward of a line connecting the offshore ends of two promontories located at Essex.

(98) (c) Shelburne, Vt. An area shoreward of a line bearing 142° from the eastern point of Collymer Pt. to Allen Hill.

(99) (c-1) Shelburne Bay. Beginning at a point on the shoreline at

(100) 44°25′53.0″N., 73°14′47.3″W.; thence north to a point at

(101) 44°26′04.8″N., 73°14′46.6″W.; thence northwesterly to a point on the shoreline at

(102) 44°26′06.9″N., 73°14′50.2″W.; thence along the shoreline to the point of beginning.

(103) (c-2) Shelburne Bay Allen Hill to La Platte River. That portion of the waters of Shelburne Bay west of the line from a point at Allen Hill at

(104) 44°24′35″N., 73°14′14″W.; to a point near the mouth of the La Platte River at

(105) 44°24′03″N., 73°14′05″W.

(106) **Note.**–The anchoring of vessels and placement of temporary moorings in the anchorage area described in paragraph (c-2) of this section are administered by the Harbormaster appointed by the Town of Shelburne, Vermont.

(107) (d) Mallets Bay, Vt. The southwesterly portion of Mallets Bay, south of Coates Island and west of a line bearing 170° from the most easterly point of Coates Island to the mainland.

(108) (e) Mallets Bay, Vt. An area in the northwesterly portion of Mallets Bay, south of a line extending from the northeasterly end of Mallets Head to the northeasterly end of Marble Island, and west of a line extending from the northeasterly end of Marble Island to the northeasterly side of Cave Island, and southerly to the point on the lower east side of Mallets Head.

(109) (f) St. Albans Bay, Vt. An area in the northerly portion of St. Albans Bay westward of the State Pier at St. Albans Bay State Park, northeasterly of a line bearing 296°30′ from the southwesterly corner of the State Pier, and southeasterly of a line parallel to and 500 feet west of the west side of the State Pier.

(110) (g) Charlotte, Vt. An area shoreward of a line bearing 080 T from 44°16′12″N., 73°17′18″W., on Thompson's Point to 44°16′16″N., 73°16′40″W., on William's Point.

(111) (h) Burlington Harbor, VT. The waters bounded by a line connecting the following points.

(112) 44°28′14.4″N., 73°13′16.5″W.

(113) 44°28′14.4″N., 73°13′19.5″W.

(114) 44°28′24.4″N., 73°13′18.4″W. and thence along the shoreline to the point of the beginning. These positions have been converted to North American Datum 83.

(115) (i) Point Au Roche, New York. The waters of Deep Bay north of a line drawn shore to shore along the 44°46′14″N line of Latitude.

(116) **Note:** Anyone wishing to occupy a mooring in this area shall obtain a permit from the New York State Office of Parks, Recreation & Preservation.

(117) **§110.77a Duluth-Superior Harbor, Duluth, Minn.**

(118) The area adjacent to Park Point in Duluth-Superior Harbor within the following boundaries: beginning at

(119) 46°45′19.3″N., 92°04′43.0″W.; thence to

(120) 46°45′11.7″N., 92°05′01.0″W.; thence to

(121) 46°44′21.2″N., 92°04′15.7″W.; thence to

(122) 46°44′29.4″N., 92°03′57.5″W.; thence to the point of beginning.

(123) **§110.77b Madeline Island, WI.**

(124) The water area in La Pointe Harbor, Madeline Island, Wisconsin, enclosed by:

(125) 46°46′21.5″N., 90°46′59″W. to

(126) 46°46′36.0″N., 90°47′13″W. to

(127) 46°46′41.0″N., 90°47′13″W. thence along the natural shoreline and structures to:

(128) 46°46′21.5′N., 90°46′59″W.

(129) **§110.78 Sturgeon Bay, Sturgeon Bay, Wis.**

(130) (a) Area 1. Beginning at a point bearing 126°, 3,000 feet from the fixed green Sturgeon Bay Canal Leading Light mounted on the highway bridge; thence 120°, 1,200 feet, this line being parallel to and 150 feet from the channel edge; thence 222°, 500 feet; thence 300°, 1,200 feet; thence 042°, 500 feet to the point of beginning.

(131) (b) Area 2. Beginning at a point 160 feet from the shoreline and on the east line of 15th Avenue extended; thence south 530 feet to a point 100 feet from the northern edge of the channel; thence southeasterly 2,350 feet along a line parallel to the northern edge of the channel to a point on the east line of 18th Avenue extended, using that portion of 18th Avenue that runs in a true north-south direction perpendicular to Utah Street; thence north 530 feet along this line of 18th Avenue extended to a point approximately 400 feet from the shoreline; thence northwesterly 2,350 feet along a line parallel to the northern edge of the channel to the point of beginning.

(132) **Note.**–An ordinance of the City of Sturgeon Bay, Wisconsin, requires moorings to be approved by the Harbor Master of the City of Sturgeon Bay and provides for other regulation of the use of vessels and moorings in this area.

(133) **§110.79a Neenah Harbor, Neenah, Wis.**

(134) (a) Area 1. The area of Neenah Harbor south of the main shipping channel within the following boundary: A line beginning at a point bearing 117.5°, 1,050 feet from the point where the southeasterly side of the First Street/Oak Street Bridge crosses the south shoreline of the river; thence 254°, 162 feet; thence 146°, 462 feet; 164°, 138 feet; 123°, 367 feet; 068°, 400 feet; 044°, 400 feet; thence 320°, 107 feet; thence 283°, 1,054 feet to the point of beginning.

(135) (b) Area 2. Commencing at a point where the west line of Second Street extended meets the north edge of the harbor, thence south to intersect the north edge of the channel at latitude

(136) 44°11′04.2″N., 88°27′13.2″W., thence northwesterly to a point at

(137) 44°11′06.3″N., 88°27′16.4″W., thence north to the easterly end of the Neenah Dam Spillway.

(138) **Note.**–An ordinance of the city of Neenah, Wis., requires approval of the Neenah Police Department for the location and type of individual moorings placed in this special anchorage area.

(139) **§110.79b Millers Bay, Lake Winnebago, Oshkosh, Wis.**

(140) The area adjacent to Menominee Park in Millers Bay within the following boundaries: beginning at

(141) 44°01′47″N., 88°31′05″W.; thence to

(142) 44°01′46″N., 88°31′00″W.; thence to

(143) 44°01′34″N., 88°31′04″W.; thence to

(144) 44°01′36″N., 88°31′08″W.; thence to point of beginning.

(145) **§110.79c Fish Creek Harbor, Fish Creek, Wis.**

(146) The area within the following boundaries: Beginning at

(147) 45°07′58″N., 87°14′41″W.; thence to

(148) 45°07′58″N., 87°14′35″W.; thence to

(149) 45°07′50″N., 87°14′30″W.; thence to

(150) 45°07′47″N., 87°14′38″W.; thence to the point of beginning.

(151) **§110.80 Milwaukee Harbor, Milwaukee, Wis.**

(152) (a) McKinley Park. The water area east of McKinley Park enclosed by a line beginning at McKinley Park Jetty Light; thence 090° 500 feet to a point on the breakwater; thence northerly and northwesterly following the breakwater, piers, jetty and natural shoreline to the point of beginning.

(153) (b) South Shore Park. The water area northeast of South Shore Park enclosed by a line beginning at the northeast corner of the jetty at

(154) 43°00′07.5″N., 87°53′08″W.; thence to

(155) 43°00′05″N., 87°53′01″W.; thence to

(156) 42°59′55″N., 87°52′53″W.; thence to

(157) 42°59′40″N., 87°52′33.5″W.; thence to a point of the shoreline at

(158) 42°59′34″N., 87°52′43.5″W.; thence following the shoreline to the point of beginning.

(159) (c) Bay View Park. The water area east of Bay View Park enclosed by a line beginning on the shoreline at latitude

(160) 42°59′28.5″N., 87°52′35″W.; thence to

(161) 42°59′35.5″N., 87°52′27″W.; thence to

(162) 42°59′08″N., 87°51′37″W.; thence to a point on the shoreline at

(163) 42°58′59″N., 87°51′46″W.; thence following the shoreline to the point of beginning.

(164) **Note.**–An ordinance of the City of Milwaukee, Wisconsin requires the approval of the Milwaukee Harbor Master for the location and type of moorings placed in these special anchorage areas.

(165) **§110.80a Lake Macatawa, Mich.**

(166) An area located on the south side of Lake Macatawa near the entrance to Lake Michigan, shoreward (south) of a line commencing offshore of Macatawa Park at a point 960 feet S 156° E from the light on the south pier at the entrance to the Lake, and extending 1,550 feet N 82° E toward the northwest corner of the Macatawa Bay Yacht Club pier.

(167) **§110.80b Marquette Harbor, Marquette, Mich.**

(168) The area within Marquette Harbor beginning at

(169) 46°32′38″N., 87°22′46″W.; thence to

(170) 46°32′37″N., 87°22′54″W.; thence to

(171) 46°32′33″N., 87°22′54″W.; thence to

(172) 46°32′33″N., 87°22′46″W.; thence to point of origin.

(173) **Note.**–An ordinance of the City of Marquette authorizes the Harbormaster to direct the location and length of time any watercraft may anchor in this area.

(174) **§110.81 Muskegon Lake, Michigan.**

(175) (a) Muskegon Lake West. The waters of the southwest side of Muskegon Lake enclosed by a line beginning at

(176) 43°13′24″N., 86°19′18.5″W.; thence 145°T to

(177) 43°13′07.5″N., 86°19′02.5″W.; thence 230°T to

(178) 43°13′04″N., 86°19′08.5″W.; thence along the shoreline to the point of origin.

(179) (b) Muskegon Lake East. The waters of the southeast side of Muskegon Lake enclosed by a line beginning at latitude

(180) 43°14′04″N., 86°15′47″W.; thence 277°T to

(181) 43°14′06.5″N., 86°16′27″W.; thence 205°T to the shore; thence along the shoreline to the point of origin.

(182) Note.–Administration of the Special Anchorage Area is exercised by the City of Muskegon pursuant to local ordinances.

(183) **§110.81a Lake Betsie, Frankfort, Mich.**

(184) The area within the following boundaries:

(185) Beginning at

(186) 44°37′47″ North, 86°13′52.5″ West; thence to

(187) 44°37′51.4″ North, 86°13′49″ West; thence to

(188) 44°37′46.4″ North, 86°13′37.8″ West; thence to

(189) 44°37′44.8″ North, 86°13′44.2″ West; thence to point of beginning.

(190) **§110.82 Charlevoix Harbor, Mich.**

(191) The waters on the north side of Round Lake northward of a line beginning at a point approximately 200 feet south of the north shore bearing 60°, 280 feet, from the northeast east corner of the Charlevoix Municipal Wharf, and bearing thence 92°, 400 feet, thence 129°, 1,160 feet, and thence 110° to the westerly end of the southwest side of Park Island.

(192) **§110.82a Little Traverse Bay, Lake Michigan, Harbor Springs, Mich.**

(193) (a) Area 1. Beginning at

(194) 45°25′42.2″N., 84°59′07.5″W.; thence to

(195) 45°25′39.5″N., 84°59′09.0″W.; thence to

(196) 45°25′35.0″N., 84°59′07.0″W.; thence to

(197) 45°25′35.0″N., 84°58′55.2″W.; thence to

(198) 45°25′42.2″N., 84°58′56.5″W.; thence to point of beginning.

(199) (b) Area 2. Beginning at

(200) 45°25′42.2″N., 84°58′54.0″W.; thence to

(201) 45°25′35.0″N., 84°58′53.0″W.; thence to

(202) 45°25′35.0″N., 84°58′24.8″W.; thence to

(203) 45°25′36.1″N., 84°58′23.0″W.; thence to

(204) 45°25′42.2″N., 84°58′39.0″W., thence to point of beginning.

(205) **§110.83 Chicago Harbor, Ill.**

(206) (a) Grant Park North-A. Beginning at a point 2,120 feet South of the Intersection of the North line of the Chicago Yacht Club bulkhead, as constructed in 1927, and the harbor line approved by the Department of the Army on August 3, 1940, along the West side of the harbor, said harbor line runs parallel to the overall alignment of said Grant Park bulkhead between its North and South ends, said intersection is approximately 800 feet South of the South face of the former Naval Armory Dock, and 100 feet East of said bulkhead, that point being approximately on the harbor line; thence North along a straight line parallel to said harbor line and bulkhead, 1,705 feet to a point that is 100 feet East of said harbor line and 150 feet East of the Grant Park bulkhead; thence East at a right angle, 150 feet; thence North at a right angle, parallel to the first described line, passing 100 feet East of the Chicago Yacht Club bulkhead, 440 feet; thence Northeasterly 850 feet to a point 1,070 feet East of the aforesaid Grant Park bulkhead; thence Southeasterly 740 feet to a point 1,600 East of said harbor line; thence Southerly 1,960 feet to a point approximately 1,555 feet East of said harbor line and about 1,560 feet East of said Grant Park bulkhead; thence Southwesterly 295 feet to a point 1,180 feet due East, in a direction perpendicular to the West line hereof, from the point of beginning; and thence West to the point of beginning.

(207) (b) Grant Part North-B. Beginning at a point 145 feet North of the North line of the Chicago Yacht Club bulkhead, as constructed in 1927, and 320 feet East of the harbor line approved by the Department of the Army on August 3, 1940, along the West side of the harbor, said Chicago Yacht Club bulkhead extends due East, perpendicular to the Grant Park bulkhead's overall alignment between its North and South ends, said bulkhead runs parallel to the aforesaid harbor line and is approximately 800 feet South of the South face of the former Naval Armory Dock, said point is 20 feet East of the East face of the Chicago Park District jetty; thence North parallel to said jetty, 230 feet to a point 20 feet South of the South face of the Lake Shore Drive bulkhead, said bulkhead runs Easterly and Westerly in a curved direction; thence Easterly along a line parallel to said curved bulkhead to a point 20 feet Southwest and perpendicular to a line extended along the Southwest side of the Columbia Yacht Club pier to said curved bulkhead; thence Southeasterly parallel to said extended line, 160 feet; thence Southwesterly to the point of beginning.

(208) (c) Grant Park North-C. Beginning at a point 970 feet North of the North line of the Chicago Yacht Club bulkhead, as constructed in 1927, which extends due East and perpendicular from the harbor line approved by the Department of the Army on August 3, 1940, said Chicago Yacht Club bulkhead line is appoximately 800 feet South of the South face of the former Naval Armory Dock, and 1,170 feet East of said harbor line, said point of beginning is 20 feet East of the East face of the Columbia Yacht Club pier and 20 feet South of the South face of a breakwater, which runs in an East and West direction; thence East along a line parallel to the South face of said East-West breakwater, 540 feet to a point 20 feet West of the West face of a breakwater, which runs in a North and South direction; thence South along a line parallel to the West face of said North-South breakwater, approximately 965 feet; thence Northwesterly to a point 20 feet Southeast and perpendicular to the Southeast side of the aforesaid Columbia Yacht Club pier; thence Northerly along a line parallel to the East face of said pier to the point of beginning.

(209) (d) Grant Park South. Beginning at a point 2,220 feet South of the intersection of the North line of the Chicago Yacht Club bulkhead, as constructed in 1927, and the harbor line approved by the Department of the Army on August 3, 1940, along the West side of the harbor, said harbor line runs parallel to the overall alignment of the Grant Park bulkhead between its North and South ends, said intersection is approximately 800 feet South of the South face of the former Naval Armory Dock, and 100 feet East of said Grant Park bulkhead, that point being approximately on the harbor line; thence East, perpendicular to the overall alignment of the Grant Park bulkhead, and perpendicular to said harbor line, 1,180 feet; thence Southeasterly 330 feet to a point 1,510 feet East of said Grant Park bulkhead and 225 feet South of an extension of the first described line; thence South perpendicular to the first described line, 220 feet; thence Southwesterly 2,375 feet along a line generally 100 feet Northwesterly from and parallel to the Northwesterly face of the narrow section of the U.S. Inner Breakwater; thence Northwesterly 100 feet to a point 150 feet East of said Grant Park bulkhead (or 100 feet East of the aforesaid harbor line), and 4,570 feet South of the North line of the aforesaid Chicago Yacht Club bulkhead; and thence North 2,350 feet of the point of beginning.

(210) **Note.**–The Chicago Park District controls the location and type of any moorings placed in the special anchorage areas in this section.

(211) **§110.83a Cedar Point, Sandusky, Ohio.**

(212) The water area enclosed by the break wall beginning at

(213) 41°28′13″N., 82°40′39″ W.; thence along the break wall to

(214) 41°28′21″N., 82°40′53″W.; thence along a straight line southwesterly to

(215) 41°28′20″N., 82°40′55″W.; thence along the break wall to

(216) 41°28′33″N., 82°40′58″W.; thence along the shoreline to the point of beginning.

(217) **§110.84 Black Rock Channel opposite foot of Porter Avenue, Buffalo, New York.**

(218) An area extending northwesterly between Black Rock Channel and Bird Island Pier opposite the foot of Porter Avenue,

bounded as follows: Beginning at Triangulation Marker "N-5" on Bird Island Pier; thence southeasterly along the pier a distance of approximately 745 feet; thence 60°52′ true, approximately 300 feet to a point 50 feet westerly of the westerly limit of Black Rock Channel; thence northwesterly along an arc of a circle parallel to and 50 feet westerly of the westerly limit of the channel to a point approximately 360 feet southerly of Bird Island Pier Light No. 17; thence 276°20′ true, approximately 135 feet to Bird Island Pier; thence southwesterly and southerly along the pier a distance of approximately 1,355 feet to the point of beginning.

(219) **§110.84a [Removed].**

(220) **§110.84b Buffalo, N.Y.**

(221) The area within the Port of Buffalo known as Port of Buffalo Small Boat Harbor commencing at a point on shore at latitude 42°51′05″N., longitude 78°51′55″W.; thence 240° to riprap dike thence following the dike to the shoreline; thence along the shoreline to the point of origin.

(222) **§110.85 Niagara River, Youngstown, N.Y.**

(223) (a) Area 1. Beginning at a point at the intersection of the south line of Swain Street extended with the east shoreline of the Niagara River at

(224) 43°14′33″N., 79°03′7.5″W.; thence westerly to a point at

(225) 43°14′33″N., 79°03′9.5″W.; thence southerly to a point at

(226) 43°14′15.5″N., 79°03′10″W.; thence westerly to a point at

(227) 43°14′15.5″N., 79°03′17″W.; thence northerly to a point at

(228) 43°14′54.5″N., 79°03′14″W.; thence southeasterly to a point at

(229) 43°14′52.3″N., 73°03′09″W.; thence southerly to a point at

(230) 43°14′51.4″N., 73°03′09″W.; thence easterly to a point at

(231) 43°14′51.5″N., 79°03′6.5″W.; thence along the shoreline to the point of beginning.

(232) (b) Area 2. Beginning at a point at

(233) 43°14′53.2″N., 79°03′08″W.; thence northwesterly to a point at

(234) 43°14′56″N., 79°03′14″W.; thence northerly to a point at

(235) 43°15′07″N., 79°03′13″W.; thence northwesterly to a point at

(236) 43°15′9.5″N., 79°03′13.5″W.; thence southeasterly to a point at

(237) 43°15′7.5″N., 79°03′08″W.; thence southerly to the point of beginning.

(238) (c) Area 3. Beginning at a point at

(239) 43°15′7.9″N., 79°03′03″W.; thence westerly to a point at

(240) 43°15′7.9″N., 79°03′04″W.; thence northwesterly to a point at

(241) 43°15′11.8″N., 79°03′14″W.; thence northerly to a point at

(242) 43°15′14″N., 79°03′14″W.; thence northwesterly to a point at

(243) 43°15′22″N., 79°03′21.5″W.; thence northeasterly to a point at

(244) 43°15′25.5″N., 79°03′13″W.; thence along the shoreline to the point of beginning.

(245) **Note.**–The Youngstown Harbor Commission controls the location, type, and assignment of moorings placed in the special anchorage areas in this section.

(246) **§110.86 Sodus Bay, N.Y.**

(247) The water area in Sodus Bay, New York, south of Sand Point, two separate sections, enclosed by:

(248) (a) Eastern Section, beginning at a point on the shoreline at

(249) 43°15′58.1″N., 076°58′34.0″W.; to

(250) 43°15′51.9″N., 076°58′33.5″W.; to

(251) 43°15′53.5″N., 076°58′47.5″W.; to

(252) 43°16′01.8″N., 076°58′43.0″W.; thence along the natural shoreline and structure to:

(253) 43°15′58.1″N., 076°58′34.0″W.

(254) (b) Western Section, beginning at a point on the shoreline at

(255) 43°16′02.5″N., 076°58′45.0″W.; to

(256) 43°15′54.0″N., 076°58′50.0″W.; to

(257) 43°15′54.8″N., 076°59′00.1″W.; to

(258) 43°16′07.0″N., 076°58′47.0″W.; thence along the natural shoreline and structure to:

(259) 43°16′02.5″N., 076°58′45.0″W.

(260) **§110.87 Henderson Harbor, New York.**

(261) (a) Area A. The area in the southern portion of Henderson Harbor west of the Henderson Harbor Yacht Club bounded by a line beginning at the point of land, approximately 150 feet west of the Graham Creek Range Rear Light; thence 180°, 50 feet; thence 275°, 810 feet; thence 000°, 1,500 feet; thence 090°, 700 feet; thence 177°, 1,250 feet to the point of land approximately 160 feet west of the Graham Creek Range Forward Light; thence along the shoreline to the point of beginning.

(262) (b) Area B. The area in the southern portion of Henderson Harbor north of Graham Creek Entrance Light bounded by a line beginning at a point 000°, 1000 feet from Graham Creek Entrance Light; thence 357°, 1,200 feet; thence 090°, 400 feet; thence 172°, 1,200 feet; 090°, 500 feet; thence 177°, 1,200 feet; thence 270°, 500 feet to the point of beginning.

(263) **Note.**–Permission must be obtained from the Town of Henderson Harbormaster before any vessel is moored or anchored in this special anchorage area.

**Subpart B–Anchorage Grounds**

(264) **§110.205 Chicago Harbor, Ill.**

(265) (a) The anchorage grounds–(1) Anchorage A, exterior breakwater. Southwest of a line parallel with and 150 feet southwestward of the exterior breakwater; west of a line parallel with and 150 feet west of the south extension of the exterior breakwater; northeast of a line parallel with and 1,500 feet southwestward of the exterior breakwater; and east of a line parallel with the south extension of the exterior breakwater and 500 feet eastward of the east face of the filtration plant.

(266) (2) Anchorage B, south arm. West of a line parallel with and 150 feet west of the south arm of the exterior breakwater; north of a line perpendicular to the south arm at its south end; east of a line parallel with the south arm, about 2,200 feet therefrom and on line with the east face of the Municipal Pier; and south of a line perpendicular to the south arm 700 feet from its north end.

(267) (3) Anchorage C, shore arm. South of a line parallel with and 150 feet southward of the shore arm of the exterior breakwater; west of a line parallel with the south extension of the exterior breakwater, 100 feet westward of the east end of the shore arm; northwest of a line perpendicular to the Lake Shore Drive revetment and 300 feet northwest of the northwest corner of the filtration plant; and east of a line parallel with and 600 feet lakeward of the Lake Shore Drive revetment.

(268) (4) Anchorage D, Chicago Harbor Lock South. Beginning at a point 35.5 feet South (16 feet South of the South face of the Southeast guidewall) and 28.0 feet West of the SE Guide Wall Light; thence Westerly and parallel to the guidewall 800 feet to a point that is 16 feet South of the South face of the Southeast guidewall; thence Southerly 80 feet to a point that is 96 feet South of the South face of the Southeast guidewall; thence Easterly 800

feet to a point that is 96 feet South of the south face of the southeast guidewall; thence Northerly 80 feet to the point of beginning.

(269) (5) Anchorage E, Chicago Harbor Lock North. Beginning at a point 156.75 feet North (16 feet North of the North face of the Northeast guidewall) and 590 feet West of the SE Guidewall Light; thence Westerly and parallel to the guidewall 600 feet to a point that is 16 feet North of the North face of the Northeast guidewall; thence Northerly 80 feet to a point that is 96 feet North of the North face of the Northeast guidewall; thence Easterly 600 feet to a point that is North of the the North face of the Northeast guidewall; thence Southerly 80 feet to the point of beginning.

(270) (b) The rules and regulations. (1) Except in cases of emergency, no vessel may be anchored in Chicago Harbor outside of the anchorage grounds in paragraph (a) of this section or the special anchorage areas prescribed in §110.83.

(271) (2) Anchors must not be placed outside the anchorage areas, nor shall any vessel be so anchored that any portion of the hull or rigging shall at any time extend outside the boundaries of the anchorage area.

(272) (3) Any vessel anchoring under circumstances of great emergency outside of the anchorage areas must be placed near the edge of the channel and in such position as not to interfere with the free navigation of the channel nor obstruct the approach to any pier nor impede the movement of any boat, and shall move away immediately after the emergency ceases, or upon notification by the Captain of the Port.

(273) (4) The maneuvering of a vessel by means of a dragged anchor, except within an established anchorage ground or in stress of weather or to avoid collision, is prohibited. Unnecessary maneuvering in any of the anchorage grounds is prohibited.

(274) (5) The directions of the Captain of the Port assigning vessels to parts of the anchorage grounds suitable to their draft, requiring vessels to anchor bow and stern, requiring shifting the anchorage of any vessel within any anchorage ground for the common convenience, or for otherwise enforcing this section, shall be promptly executed by owners, masters, and persons in charge of vessels.

(275) (6) Nothing in this section shall be construed as relieving the owner or person in charge of any vessel from the penalties of the law for obstructing navigation or for obstructing or interfering with range lights, or for not complying with the navigation laws in regard to lights, fog signals, or for otherwise violating law.

(276) (7) No vessel may use anchorages A, B, D, and E except commercial vessels operated for profit. No person may place floats or buoys for marking moorings or anchors in place in anchorages A and B. No person may place fixed mooring piles or stakes in anchorages A and B. (Mooring facilities are available adjacent to the lakeside guidewalls of the Chicago Harbor Lock in anchorages D and E.) All vessels using anchorages D and E shall moor against pile clusters adjacent to the respective anchorage.

(277) Any time barges are moored in anchorage D or E, a manned towing vessel shall be present in one of these anchorages. Exceptions to this surveillance requirement are allowable for periods not to exceed one hour.

(278) (8) No commercial vessels operated for profit that measure 50 gross tons or more may anchor in anchorage C. Temporary floats or buoys for marking moorings or anchors in place may be used in anchorage C. No person may place a fixed mooring pile or stake in anchorage C.

(279) **§110.206 Detroit River, Michigan.**

(280) (a) The Anchorage grounds. Belle Isle Anchorage. The area is in the Detroit River immediately downstream from Belle Isle on the U.S. side of the International Boundary line within the following boundaries: beginning at a point bearing 250 T, 5400 feet from the James Scott Memorial Fountain (42°20′06″N., 82°59′57″W.) at the West end of Belle Isle; then 251 T, 3000 feet; thence 341 T, 800 feet; thence 071 T, 3000 feet; thence 161 T, 800 feet to the point of beginning.

(281) (b) The regulations. (1) Vessels shall be anchored so as not to swing into the channel or across steering courses.

(282) (2) The Belle Isle Anchorage area is for the temporary use of vessels of all types, but especially for naval and merchant vessels awaiting berths, weather, or other conditions favorable to the resumptions of their voyage.

(283) (3) No vessel may be anchored unless it maintains a continuous bridge watch, guards and answers channel 16 FM and channel 12 FM (VTC SARNIA sector frequency), maintains an accurate position plot and can take appropriate action to ensure the safety of the vessel, structures and other vessels.

(284) (4) Vessels may not anchor in the Belle Isle Anchorage for more than 72 hours without permission of the Captain of the Port of Detroit.

(285) **§110.207 Cleveland Harbor, Ohio.**

(286) (a) The anchorage grounds–(1) West anchorage. The northwesterly portion of the West Basin between the northwest limits of the West Basin and a line parallel to and 1,050 feet distant from the West Breakwater; and from the southwest limits of the West Basin to a line perpendicular to the West Breakwater, 2,050 feet southwesterly along the West Breakwater from Cleveland West Breakwater Light.

(287) (2) East anchorage. The southeasterly portion of the East Basin between the mainland and a line parallel to and 1,250 feet distant from the East Breakwater; from opposite Cleveland East Entrance Light to a due north line passing through the flashing white light on the Allied Oil Company dock.

(288) **Note.**–The westerly limit of the anchorage area is no longer marked by the Allied Oil Company dock light. The line defined lies approximately on meridian 81°40′34″.

(289) (3) Explosives anchorage. In Lake Erie, northwest of Cleveland Harbor East Breakwater, and including a rectangular area marked by four white spar buoys at the following true bearings and distances from Cleveland East Pierhead Light: 38°30′, 2,050 feet; 68°, 2,050 feet; 57°, 7,050 feet; and 49°, 7,050 feet.

(290) (b) The regulations. (1) The west and east anchorages are general anchorages.

(291) (2) Use of the explosives anchorage shall be subject to the supervision of the Captain of the Port.

(292) **§110.208 Buffalo Harbor, N.Y.**

(293) (a) The anchorage grounds–(1) Explosives Anchorage A Inside the south section of the main breakwater 700 feet wide starting at a point 500 feet southerly from the south end of the north section and extending approximately 153° true 3,000 feet parallel to the line of the south section of the main breakwater.

## Part 117–Drawbridge Operation Regulations

### Subpart A–General Requirements

(294) **§117.1 Purpose.**

(295) This subpart prescribes general requirements relating to the use and operation of drawbridges across the navigable waters of the United States.

(296) **Note.**–The primary jurisdiction to regulate drawbridges across the navigable waters of the United States is vested in the Federal Government. Laws, ordinances, regulations, and rules which purport to regulate these bridges and which are not promulgated by the Federal Government have no force and effect.

(297) **§117.3 Applicability.**

(298) The provisions of this subpart not in conflict with the provisions of Subpart B apply to each drawbridge.

(299) **Note.**–For all of the requirements applicabldrawbridge listed in Subpart B, one must review the requirements in Subpart A and §§117.51 through 117.99 of Subpart B, as well as the requirements in Subpart B applicable to the particular drawbridge in question.

(300) **§117.4 Definitions.**

(301) Certain terms used in this part are defined in this section.

(302) **Appurtenance**. The term "appurtenance" means an attachment or accessory extending beyond the hull or superstructure that is not anintegral part of the vessel and is not needed for a vessel's piloting, propelling, controlling, or collision avoidance capabilities.

(303) **Lowerable.** The term "lowerable" means the nonstructural vessel appurtenance can be mechanically or manually lowered and raised again. The term "lowerable" also applies to a nonstructural vessel appurtenance which can be modified to make the item flexible, hinged, collapsible, or telescopic such that it can be mechanically or manually lowered and raised again. Failure to make the modification is considered equivalent to refusing to lower a lowerable nonstructural appurtenance that is not essential to navigation. Examples of appurtenances which are considered to be lowerable include, but are not limited to, fishing outriggers, radio antennae,television antennae, false stacks, and masts purely for ornamental purposes. Examples of appurtenances which are not considered to belowerable include, but are not limited to, radar antennae, flying bridges, sailboat masts, piledriver leads, spud frames on hydraulic dredges, drilling derricks' substructures and buildings, cranes on drilling or construction vessels, or other items of permanent and fixed equipment.

(304) **Nonstructural.** The term "nonstructural" means that the item is not rigidly fixed to the vessel and is thus susceptible to relocation or alteration.

(305) **Not essential to navigation.** The term "not essential to navigation" means the nonstructural vessel appurtenance does not adversely affect the vessel's piloting, propulsion, control, or collision avoidance capabilities when in the lowered position.

(306) **§117.5 When the draw shall open.**

(307) Except as otherwise required by this subpart, drawbridges shall open promptly and fully for the passage of vessels when a request to open is given in accordance with this subpart.

(308) **§117.7 General duties of drawbridge owners and tenders.**

(309) (a) Drawbridge owners and tenders shall operate the draw in accordance with the requirement in this part.

(310) (b) Except for drawbridges not required to open for the passage of vessels, owners of drawbridges shall ensure that:

(311) (1) The necessary drawtenders are provided for the safe and prompt opening of the draw;

(312) (2) The operating machinery of the draw is maintained in a serviceable condition; and

(313) (3) The draws are operated at sufficient intervals to assure their satisfactory operation.

(314) **§117.9 Delaying opening of a draw.**

(315) No person shall unreasonably delay the opening of a draw after the signals required by §117.15 have been given.

(316) **Note.**–Trains are usually controlled by the block method. That is, the track is divided into blocks or segments of a mile or more in length. When a train is in a block with a drawbridge, the draw may not be able to open until the train has passed out of the block and the yardmaster or other manager has "unlocked" the drawbridge controls. The maximum time permitted for delay is defined in Subpart B for each affected bridge. Land and water traffic should pass over or through the draw as soon as possible in order to prevent unnecessary delays in the opening and closure of the draw.

(317) **§117.11 Unnecessary opening of the draw.**

(318) No vessel owner or operator shall–

(319) (a) Signal a drawbridge to open if the vertical clearance is sufficient to allow the vessel, after all lowerable nonstructural vessel appurtenances that are not essential to navigation have been lowered, to safety pass under the drawbridge in the closed position; or

(320) (b) Signal a drawbridge to open for any purpose other than to pass through the drawbridge opening.

(321) **§117.15 Signals.**

(322) (a) General. (1) The operator of each vessel requesting a drawbridge to open shall signal the drawtender and the drawtender shall acknowledge that signal. The signal shall be repeated until acknowledged in some manner by the drawtender before proceeding.

(323) (2) The signals used to request the opening of the draw and to acknowledge that request shall be sound signals, visual signals, or radiotelephone communications described in this subpart.

(324) (3) Any of the means of signaling described in this subpart sufficient to alert the party being signaled may be used.

(325) (b) Sound signals. (1) Sound signals shall be made by whistle, horn, megaphone, hailer, or other device capable of producing the described signals loud enough to be heard by the drawtender.

(326) (2) As used in this section, "prolonged blast" means a blast of four to six seconds duration and "short blast" means a blast of approximately one second duration.

(327) (3) The sound signal to request the opening of a draw is one prolonged blast followed by one short blast sounded not more than three seconds after the prolonged blast. For vessels required to be passed through a draw during a scheduled closure period, the sound signal to request the opening of the draw during that period is five short blasts sounded in rapid succession.

(328) (4) When the draw can be opened immediately, the sound signal to acknowledge a request to open the draw is one prolonged blast followed by one short blast sounded not more then 30 seconds after the requesting signal.

(329) (5) When the draw cannot be opened immediately, or is open and shall be closed promptly, the sound signal to acknowledge a request to open the draw is five short blasts sounded in rapid succession not more than 30 seconds after the vessel's opening signal. The signal shall be repeated until acknowledged in some manner by the requesting vessel.

(330) (c) Visual signals. (1) The visual signal to request the opening of a draw is–

(331) (i) A white flag raised and lowered vertically; or

(332) (ii) A white, amber, or green light raised and lowered vertically.

(333) (2) When the draw can be opened immediately, the visual signal to acknowledge a request to open the draw, given not more than 30 seconds after the vessel's opening signal, is–

(334) (i) A white flag raised and lowered vertically;

(335) (ii) A white, amber, or green light raised and lowered vertically, or

(336) (iii) A fixed or flashing white, amber, or green light or lights.

(337) (3) When the draw cannot be opened immediately, or is open and must be closed promptly, the visual signal to acknowledge a request to open the draw is–

(338) (i) A red flag or red light swung back and forth horizontally in full sight of the vessel given not more than 30 seconds after the vessel's opening signal; or

(339) (ii) A fixed or flashing red light or lights given not more than 30 seconds after the vessel's opening signal.

(340) (4) The acknowledging signal when the draw cannot open immediately or is open and must be closed promptly shall be repeated until acknowledged in some manner by the requesting vessel.

(341) (d) Radiotelephone communications. (1) Radiotelephones may be used to communicate the same information provided by sound and visual signals.

(342) **NOTE**: Call signs and radio channels for drawbridges equipped with radiotelephones are included with the bridge descriptions in chapters 4 through 14.

(343) (2) The vessel and the drawtender shall monitor the frequency used until the vessel has cleared the draw.

(344) (3) When radiotelephone contact cannot be initiated or maintained, sound or visual signals under this section shall be used.

(345) **§117.17 Signalling for contiguous drawbridges.**

(346) When a vessel must pass two or more drawbridges close together, the opening signal is given for the first bridge. After acknowledgement from the first bridge that it will promptly open, the opening signal is given for the second bridge, and so on until all bridges that the vessel must pass have been given the opening signal and have acknowledged that they will open promptly.

(347) **§117.19 Signalling when two or more vessels are approaching a drawbridge.**

(348) When two or more vessels are approaching the same drawbridge at the same time, or nearly the same time, whether from the same or opposite directions, each vessel shall signal independently for the opening of the draw and the drawtender shall reply in turn to the signal of each vessel. The drawtender need not reply to signals by vessels accumulated at the bridge for passage duringa scheduled open period.

(349) **§117.21 Signalling for an opened drawbridge.**

(350) When a vessel approaches a drawbridge with the draw in the open position, the vessel shall give the opening signal. If no acknowledgement is received within 30 seconds, the vessel may proceed, with caution, through the open draw.

(351) **§117.23 Installation of radiotelephones.**

(352) (a) When the District Commander deems it necessary for reasons of safety of navigation, the District Commander may require the installation and operation of a radiotelephone on or near a drawbridge.

(353) (b) The District Commander gives written notice of the proposed requirement to the bridge owner.

(354) (c) All comments the owner wishes to submit shall be submitted to the District Commander within 30 days of receipt of the notice under paragraph (b) of this section.

(355) (d) If, upon consideration of the comments received, the District Commander determines that a radiotelephone is necessary, the District Commander notifies the bridge owner that a radiotelephone shall shall be installed and gives a reasonable time, not to exceed six months, to install the radiotelephone and commence operation.

(356) **§117.24 Radiotelephone installation identification.**

(357) (a) The Coast Guard authorizes, and the District Commander may require the installation of a sign on drawbridges, on the upstream and downstream sides, indicating that the bridge is equipped with and operates a VHF radiotelephone in accordance with §117.23.

(358) (b) The sign shall give notice of the radiotelephone and its calling and working channels–

(359) (1) In plain language; or

(360) (2) By a sign consisting of the outline of a telephone handset with the long axis placed horizontally and a vertical three-legged lightning slash superimposed over the handset. The slash shall be as long vertically as the handset is wide horizontally and normally not less than 27 inches and no more than 36 inches long. The preferred calling channel should be shown in the lower left quadrant and the preferred working channel should be shown in the lower right quadrant.

(361) **§117.31 Operation of draw for emergency situations.**

(362) (a) When a drawtender is informed by a reliable source that an emergency vehicle is due to cross the draw, the drawtender shall take all reasonable measures to have the draw closed at the time the emergency vehicle arrives at the bridge.

(363) (b) When a drawtender receives notice, or a proper signal as provided in §117.15 of this part, the drawtender shall take all reasonable measures to have the draw opened, regardless of the operating schedule of the draw, for passage of the following, provided this opening does not conflict with local emergency management procedures which have been approved by the cognizant Coast Guard Captain of the Port:

(364) (1) Federal, State, and local government vessels used for public safety;

(365) (2) vessels in distress where a delay would endanger life or property;

(366) (3) commercial vessels engaged in rescue or emergency salvage operations; and

(367) (4) vessels seeking shelter from severe weather.

(368) **§117.33 Closure of draw of natural disasters or civil disorders.**

(369) Drawbridges need not open for the passage of vessels during periods of natural disasters or civil disorders declared by the appropriate authorities unless otherwise provided for in Subpart B or directed to do so by the District Commander.

(370) **§117.35 Operations during repair or maintenance.**

(371) (a) When operation of the draw must deviate from the regulations in this part for scheduled repair or maintenance work, the drawbridge owner shall request approval from the District Commander at least 30 days before the date of the intended change. The request shall include a brief description of the nature of the work to be performed and the times and dates of requested changes. The District Commander's decision is forwarded to the applicant within five working days of the receipt of the request. If the request is denied, the reasons for the denial are forwarded with the decision.

(372) (b) When the draw is rendered inoperative because of damage to the structure or when vital, unscheduled repair or maintenance work shall be performed without delay, the drawbridge owner shall immediately notify the District Commander and give the reasons why the draw is or should be rendered inoperative and the expected date of completion of the repair or maintenance work.

(373) (c) All repair or maintenance work under this section shall be performed with all due speed in order to return the draw to operation as soon as possible.

(374) (d) If the operation of the draw will be affected for periods of less than 60 days, the regulations in this part will not be amended. Where practicable, the District Commander publishes

notice of temporary deviations from the regulations in this part in the Federal Register and Local Notices to Mariners. If operation of the draw is expected to be affected for more than 60 days, the District Commander publishes temporary regulations covering the repair period.

(375) **§117.37 Opening or closure of draw for public interest concerns.**

(376) (a) For reasons of public health or safety or for public functions, such as street parades and marine regattas, the District Commander may authorize the opening or closure of a drawbridge for a specified period of time.

(377) (b) Requests for opening or closure of a draw shall be submitted to the District Commander at least 30 days before the proposed opening or closure and include a brief description of the proposed event or other reason for the request, the reason why the opening or closure is required, and the times and dates of the period the draw is to remain open or closed.

(378) (c) Approval by the District Commander depends on the necessity for the opening or closure, the reasonableness of the times and dates, and the overall effect on navigation and users of the bridge.

(379) **§117.39 Closure of draw due to infrequent use.**

(380) Upon written request by the owner or operator of a drawbridge, the District Commander may, after notice in the Federal Register and opportunity for public comment, permit the draw to be closed and untended due to infrequency of use of the draw by vessels. The District Commander may condition approval on the continued maintenance of the operating machinery.

(381) **§117.41 Maintenance of draw in fully open position.**

(382) The draw may be maintained in the fully open position to permit the passage of vessels and drawtender service discontinued if the District Commander is notified in advance. The draw shall remain in the fully open position until drawtender service is restored or authorization under §117.39 is given for the draw to remain closed and untended.

(383) **§117.43 Changes in draw operation requirements for regulatory purposes.**

(384) In order to evaluate suggested changes to the drawbridge operation requirements, the District Commander may authorize temporary deviations from the regulations in this part for periods not to exceed 90 days. Notice of these deviations is disseminated in the Local Notices to Mariners and published in the Federal Register.

(385) **§117.45 Operation during winter in the Great Lakes area.**

(386) (a) The Commander, Ninth Coast Guard District, may determine that drawbridges located in the Ninth Coast Guard District need not open during the winter season when general navigation is curtailed, unless a request to open the draw is given at least 12 hours before the time of the intended passage.

(387) (b) Notice of these determinations is disseminated in Local Notices to Mariners and other appropriate media. Notices indicate–

(388) (1) The name and location of the bridge affected;

(389) (2) The period of time covered; and

(390) (3) The telephone number and address of the party to whom requests for openings are given.

(391) **§117.47 Clearance gauges.**

(392) (a) Clearance gauges are required for drawbridges across navigable waters of the United States discharging into the Atlantic Ocean south of Delaware Bay (including the Lewes and Rehoboth Canal, DE) or into the Gulf of Mexico (including coastal waterways contiguous thereto and tributaries to such waterways and the lower Atchafalaya River, LA), except the Mississippi River and its tributaries and outlets.

(393) (b) Except for provisions in this part which specify otherwise for particular drawbridges, clearance gauges shall be designed, installed, and maintained according to the provisions of 33 CFR 118.160 (not carried in this Coast Pilot).

(394) **Note.**–Clearance gauge requirements, if any, for drawbridges other than those referred to in this section are listed in Subpart B under the appropriate bridge.

(395) **§117.49 Process of violations.**

(396) (a) Complaints of alleged violations under this part are submitted to the District Commander of the Coast Guard District in which the drawbridge is located.

(397) (b) Penalties for violations under this part are assessed and collected under Subpart 1.07 of Part 1 of this chapter (not published in this Coast Pilot; see **33 CFR 1.07**).

**Subpart B–Specific Requirements**

(398) **§117.51 Purpose.**

(399) This subpart prescribes specific requirements relating to the operation of certain drawbridges.

(400) **Note.**–The drawbridges under this subpart are listed by the waterway they cross and by the state in which they are located. Waterways are arranged alphabetically by state. The drawbridges listed under a waterway are generally arranged in order from the mouth of the waterway moving upstream. The drawbridges on the Atlantic Intracoastal Waterway are listed from north to south and on the Gulf Intracoastal Waterway from east to west.

(401) **§117.53 Applicability.**

(402) (a) The requirements in this subpart apply to the bridges listed and are in addition to, or vary from, the general requirements in Subpart A.

(403) (b) A requirement in this subpart which varies from a general requirement in Subpart A supersedes the general requirement.

(404) (c) All other general requirements in Subpart A not at variance apply to the bridges listed in this subpart.

(405) (d) The draws of a number of the bridges listed in this subpart need not open for the passage of vessels during certain periods, however, this does not preclude the bridge owner from directing the drawtender to open the draw during these periods.

(406) **§117.55 Posting of requirements.**

(407) (a) The owner of each drawbridge under this subpart, other than removable span bridges, shall ensure that a sign summarizing the requirements in this subpart applicable to the bridge is posted both upstream and downstream of the bridge. The requirements to be posted need not include those in Subpart A or §§117.51 through 117.99.

(408) (b) The signs shall be of sufficient size and so located as to be easily read at any time from an approaching vessel.

(409) (c) If advance notice is required to open the draw, the signs shall also state the name, address, and telephone number of the person to be notified.

(410) **§117.57 Advance notice.**

(411) Owners and tenders of drawbridges requiring advance notice to open shall use all reasonable means to open the draw at the requested time and give due regard to the possibility that a brief delay may be experienced by the vessel giving the advance notice.

(412) **§117.59 Special requirements due to hazards.**

(413) For the duration of occurrences hazardous to safety or navigation, such as floods, freshets, and damage to the bridge or fender system, the District Commander may require the owner of

an operational drawbridge listed in this subpart to have the bridge attended full time and open on signal.

(414) **ILLINOIS**

(415) **§117.389 Calumet River.**

(416) The draws of the Conrail bridges, miles 1.4 and 1.5 at Chicago, operate as follows:

(417) (a) The draws shall open on signal; except that, if either one of the bridges is inoperable because of equipment breakdown, the other bridge need not be opened.

(418) (b) In addition to the signals prescribed in §117.15, the following special visual signals shall be used on the bridges:

(419) (1) When the draw cannot be opened immediately, or is open and must be closed promptly, two red lights are flashed alternately.

(420) (2) When the draw can be opened immediately, two amber lights are flashed alternately.

(421) (3) When the draw is open for passage, two green lights are flashed alternately.

(422) **§117.391 Chicago River.**

(423) The draws of bridges operated by the City of Chicago shall operate as follows:

(424) (a) For commercial vessels:

(425) (1) From April 1 through November 30–

(426) (i) The draws of the bridges across the Chicago River from its mouth to the junction of the North and South Branches, across the South Branch from the junction to and including the Roosevelt Road, and the Kinzie and Ohio Street bridges across the North Branch shall open on signal; except that, from Monday through Friday from 7:30 a.m. to 10 a.m., and 4 p.m. to 6:30 p.m., the draws need not be opened for the passage of commercial vessels.

(427) (ii) The draws of the bridges across the North Branch of the Chicago River at Grand Avenue, the bridges across the North Branch of the Chicago River north of the Ohio Street bridge to and including North Halsted Street, and bridges across the South Branch of the Chicago River North of South Halsted Street to, but not including Roosevelt Road, shall open on signal; except that, from Monday through Friday from 7 a.m. to 8 a.m. and 5:30 p.m. to 6:30 p.m., the draws need not open for the passage of commercial vessels.

(428) (iii) The draws of the bridges across the North Branch of the Chicago River north of North Halsted Street and the South Branch of the Chicago River south of South Halsted Street shall open on signal; except that, from Monday through Friday from 7 a.m. to 8 a.m. and 5:30 p.m. to 6:30 p.m. the draws need not be opened for the passage of commercial vessels.

(429) (iv) Subject to the restrictions in paragraphs (a)(1)(i) through at (a)(1)(iii) of this section, the draw of the Cermak Road bridge across the South Branch of the Chicago River, shall open on signal. The draws of the following bridges in Chicago shall open on signal if tended or within 30 minutes after notice is given to the City of Chicago Bridge Desk:

(430) **South Branch.**

(431) Randolph Street

(432) Washington Street

(433) Madison Street

(434) Monroe Street

(435) Adams Street

(436) Jackson Boulevar

(437) Van Buren Street

(438) Congress Street (Eisenhower Expressway)

(439) Harrison Street

(440) Roosevelt Road

(441) Eighteenth Street

(442) Canal Street

(443) South Halsted Street

(444) South Loomis Street

(445) **West Fork of the South Branch**

(446) South Ashland Avenue

(447) South Damen Avenue

(448) **Chicago River, North Branch**

(449) Division Street

(450) Grand Avenue

(451) Chicago Avenue

(452) North Halsted Street

(453) (2) From December 1 through March 31, the draws of the highway bridges across the Chicago River, the North Branch of the Chicago River, and the South Branch of the Chicago River shall open on signal if at least 12 hours notice is given. However, the bridges need not open during those periods of time specified in (a)(1)(i), (ii) and (iii) of this section.

(454) (b) For recreational vessels:

(455) (1) From April 1 through November 30–

(456) (i) The draws shall be scheduled to open, before 1 p.m., twice on Saturdays and twice on Sundays if requests for passage have been received at least 20 hours in advance. If the bridges have been authorized to remain closed for portions of a Saturday or Sunday to accommodate special events, openings shall be scheduled after 1 p.m. as necessary to provide two openings per day.

(457) (ii) The draws shall open on Monday and Friday, after 6:30 p.m. Each opening requires notice that has been given at least 6 hours in advance of a vessel's requested time of passage.

(458) (iii) The draws shall open on Wednesdays at 10 a.m., or as soon thereafter as practical, if a request for passage has been given at least 20 hours in advance.

(459) (iv) The draws shall open at times in addition to those listed in paragraphs (b)(1)(i) through (b)(1)(iii) of this section, after notice has been given at least 20 hours in advance requesting passage for a flotilla of a least five vessels. However, the bridges need not open during those periods of time specified in paragraphs (a)(1)(i), (ii) and (iii) of this section.

(460) (2) From December 1 through March 31, the draws of the highway bridges across the Chicago River, the North Branch of the Chicago River, and the South Branch of the Chicago River need open on signal only if at least 48 hours notice is given. However, the bridges need not open during those periods of time specified in (a)(1)(i), (ii) and (iii) of this section.

(461) (3) Paragraph (b) of this section applies to the following listed bridges:

(462) **Main Branch**

(463) Lake Shore Drive

(464) Columbus Drive

(465) Michigan Avenue

(466) Wabash Avenue

(467) State Street

(468) Dearborn Street

(469) Clark Street

(470) LaSalle Street

(471) Wells Street

(472) Franklin-Orleans Street

(473) **South Branch**

(474) Lake Street

(475) Randolph Street

(476) Washington Street

(477) Monroe Street

(478) Madison Street
(479) Adams Street
(480) Jackson Boulevard
(481) Van Buren Street
(482) Eisenhower Expressway
(483) Harrison Street
(484) Roosevelt Road
(485) 18th Street
(486) Canal Street
(487) South Halsted Street
(488) South Loomis Street
(489) South Ashland Avenue
(490) **North Branch**
(491) Grand Avenue
(492) Ohio Street
(493) Chicago Avenue
(494) N. Halsted Street

(495) (c) The following bridges need not be opened for the passage of vessels: The draws of the North Avenue, Cortland Street, Webster Avenue, North Ashland Avenue, Chicago and Northwestern Railroad, North Damen Avenue bridges across the North Branch of the Chicago River, and the draws of the N. Halsted St. bridge, the Division St. bridge and the Chicago, Milwaukee, St. Paul and Pacific Railroad bridge across the North Branch Canal.

(496) (d) The opening signal for all Chicago River bridges is three short blasts or by shouting, except that four short blasts is the opening signal for the Chicago and Northwestern railroad bridge near Kinzie Street and the Milwaukee Road bridge near North Avenue and five short blasts is the opening signal for the Lake Shore bridge when approaching from the north.

(497) (e) The emergency provisions of §117.31 of this part applyto the passage of all vessels and the operation of all bridges onthe Chicago River.

(498) **§117.393 Illinois Waterway.**

(499) (a) The draw of the automated Burlington Northern Santa Fe railroad bridge, mile 88.8 at Beardstown, Illinois, operates as follows:

(500) (1) The draw is normally maintained in the fully open position, displaying a green light to indicate that vessels may pass.

(501) (2) When a vessel is approaching and the draw is in the open position, contact shall be established by radiotelephone with the remote operator to assure that the draw remains open until passage is complete.

(502) (3) When a vessel is approaching and the draw is in the closed position, contact shall be established by radiotelephone with the remote operator. If the draw cannot be opened immediately, alternate flashing red lights are displayed. If the draw can be opened immediately, flashing amber lights are displayed.

(503) (4) When a train approaches the bridge and the draw is in the open position, the operator shall activate alternate flashing red lights on top of the draw, sound four short blasts, and scan the river on radar to determine whether any vessel is approaching the bridge. The remote operator shall also broadcast that the draw is closing. If a vessel or vessels are approaching the bridge within one mile, as determined by radar scanning, response to radio broadcast, or electronic detector, the flashing red lights shall be changed to flashing amber and the operator shall keep the draw in the fully open position until the vessel or vessels have cleared the bridge. If no vessel is approaching the bridge or is beneath the draw, the draw may be lowered and locked in place.

(504) (5) After the train has cleared the bridge, the draw shall be raised to its full height and locked in place, the red flashing lights stopped, and the draw lights changed from red to green.

(505) (b) The draw of the Chicago and Northwestern railroad bridge, Mile 151.2, at Pekin, Illinois, is operated by a remote operator located at the Union Pacific offices in Chicago, Illinois, as follows:

(506) (1) The draw is normally maintained in the fully open position, displaying green midchannel lights to indicate that the span is fully open.

(507) (2) The draw is equipped with the following:

(508) (i) A radiotelephone link direct to the remote operator;

(509) (ii) A horn for sound signals;

(510) (iii) Eight high intensity amber warning lights, oriented upstream and downstream, with two secured to the uppermost chord and two secured to the lowermost chord of the drawspan;

(511) (iv) A radar antenna on the lower portion of the drawspan capable of scanning one mile upstream and one mile downstream; and

(512) (v) Infrared scanners located on the upstream and downstream ends of the channel span piers, to detect vessels or other obstructions under the bridge.

(513) (3) The remote operator shall maintain a radiotelephone watch for mariners to establish contact as they approach the bridge to ensure that the draw is open or that it remains open until passage is complete.

(514) (4) When a train approaches the bridge and the draw is in the open position, the remote operator initiates a ten minute warning period before closing the bridge. During this warning period, the amber lights begin flashing and a signal of four short blasts sounds on a horn. The four-blast signal will repeat after a five second interval . A synthesized-voice message is broadcast over the radiotelephone as follows:

(515) "The Union Pacific railroad bridge at Mile 151.2, Illinois River, will close to navigation in ten minutes." The announcement is repeated every two minutes, counting down the time remaining until closure.

(516) (5) At the end of the ten minute warning period, the remote bridge operator scans under the bridge using infrared detectors and the upstream and downstream approaches to the bridge using radar to determine whether any vessels are under or are approaching the bridge. If any vessels are under or are approaching the bridge within one mile as determine by infrared or radar scanning or by a radiotelephone response, the remote operator shall not close the bridge until the vessel or vessels have cleared the bridge.

(517) (6) If no vessels are under or approaching the bridge, the midchannel navigation lights will change from green to red, the horn signal of four short blasts will sound, twice, and the radiotelephone message will change to: Union Pacific Railroad Bridge at Mile 151.2, Illinois River, is closed to navigation. The message will repeat every two minutes and the amber lights will continue to flash until the bridge is fully reopened.

(518) (7) If the infrared scanners detect a vessel or other obstruction under the bridge before the drawspan is fully lowered and locked, the closing sequence is stopped, automatically, and the drawspan is raised to its fully open position until the channel is clear. When obstruction has cleared the navigation span, the remote operator confirms that the channel is clear, and reinitiates the ten-minute warning cycle.

(519) (8) After the train has cleared the bridge, the remote operator initiates the lift span raising cycle. When the draw is raised to its full height and locked in place, the flashing lights stop and the midchannel navigation lights change from red to green. The synthesized voice announcement broadcasts at two minute intervals for ten minutes that the bridge is reopened to navigation.

(520) (c) The draws of the McDonough Street Bridge, mile 287.3; Jefferson Street bridge, mile 287.9; Cass Street bridge, mile 288.1; Jackson Street bridge, mile 288.4; and Ruby Street bridge, mile 288.7; all at Joliet, shall open on signal, except that they need not open from 7:30 a.m. to 8:30 a.m. and from 4:15 p.m. to 5:15 p.m. Monday through Saturday.

(521) (d) The drawspan of the Elgin, Joliet and Eastern Railway bridge, mile 290.1 at Lockport, Illinois, is operated by remote operator located at the Elgin, Joliet & Eastern offices in Gary, Indiana as follows:

(522) (1) The drawspan is normally maintained in the fully open to navigation position displaying green center span navigation lights to indicate that the drawspan is fully open.

(523) (2) The bridge is equipped with the following:

(524) (i) A radiotelephone link direct to the remote operator;

(525) (ii) A radar antenna on top of the drawspan capable of scanning the river, one mile upstream and one mile downstairs;

(526) (iii) Infrared boat detectors under the drawspan, to allow the remote bridge operator to detect vessels under the drawspan;

(527) (iv) Electronic motion detectors under the drawspan to allow the remote bridge operator to detect vessel movement under the drawspan;

(528) (v) A siren for sound signals; and

(529) (iv) Red and green center span navigation lights.

(530) (3) The remote bridge operator shall maintain a 24 hour VHF marine radio channel 16 watch for mariners to establish contact as they approach the bridge to ensure that the drawspan is open or that it remains open until passage of river traffic is complete.

(531) (4) When rail traffic approaches the bridge, and the drawspan is in the open position, the remote bridge operator initiates a one minute warning period before closing the drawspan. During this warning period, the remote operator shall broadcast at least twice, via marine radio, channel 16, that: "The drawspan of the EJ Railroad bridge will be lowered in one minute." A siren on the bridge sounds for 20 seconds, to warn anyone on or under bridge that the drawspan will be lowered.

(532) (5) If a vessel is approaching the bridge upbound or, departing the Lockport Lock and Dam at mile 291.1, downbound, with intentions of passing through the drawspan, they shall respond to the remote bridge operators marine radio broadcast, or initiate radio contact, indicating their proximity to the bridge and requesting an opening of the drawspan or that the drawspan remain open until the vessel passes. If any approaching vessel is detected or if a radiotelephone response is received, the remote operator shall not close the drawspan until the vessel or vessels have cleared the bridge.

(533) (6) At the end of the one minute warning period, if no river traffic is approaching or under the drawspan, the remote bridge operator may begin lowering the drawspan. Navigation lights located at the center of the drawspan change from green to red when the drawspan is not in the fully open to navigation position. The drawspan takes approximately 90 seconds to lower.

(534) (7) If the presence of a vessel or other obstruction is discovered approaching or under the drawspan, during the lowering sequence, before the drawspan is fully lowered and locked, the drawspan shall be stopped and raised to the fully open position. When the vessel or obstruction has cleared the drawspan, the remote operator shall confirm that the channel is clear and reinitiate the one minute warning cycle before lowering the drawspan.

(535) (8) If no marine traffic is present the drawspan may be lowered and seated. When the drawspan is lowered and locked in the closed to navigation position, the remote bridge operator periodically broadcasts, via marine radio, that: "The drawspan of the EJ Railroad bridge is closed to navigation."

(536) (9) Failure of the radar system, radio telephone system, infrared boat detectors or electronic motion sensors shall prevent lowering the drawspan from the remote location.

(537) (10) When rail traffic has cleared the bridge, the remote bridge operator shall raise the drawspan to the fully open to navigation position. When the drawspan is raised and in the fully open to navigation position, the remote bridge operator broadcast, at least twice, via marine radio, that: "The drawspan of the EJ Railroad bridge is open to navigation." The center drawspan navigation lights change from red to green when the drawspan is fully open to navigation.

(538) **INDIANA**

(539) **§117.401 Trail Creek.**

(540) The draw of the Amtrak bridge, mile 0.85 at Michigan City, shall open on signal from 6:30 a.m. to 2:30 p.m. daily except Sunday from February 16 through December 14. The draw is not manned at all other times. If passage is desired, the Chief Dispatcher, Amtrak at Chicago, shall be notified. Collect telephone calls are accepted. The dispatcher shall arrange to have the draw open within 20 minutes.

(541) **MICHIGAN**

(542) **§117.624 Black River (South Haven)**

(543) The draw of the Dyckman Avenue bridge, mile 1.9 at South Haven, shall open as follows:

(544) (a) From May 1 through October 14–

(545) (1) From 7 a.m. to 11 p.m., seven days a week the draw need open only on the hour and half-hour; however, Mondays through Fridays the draw need not open at 12 noon and 1 p.m. Commercial vessels shall be passed through the draw of this bridge as soon as possible even though this regulated period is in effect.

(546) (2) From 11 p.m. to 7 a.m., no bridgetender is required to be in continuous attendance at the bridge and the draw shall open on signal for the commercial vessels and pleasure craft if at least a three hour advance notice is given.

(547) (b) From October 15 through April 30, the draw shall open on signal for the passage of commercial vessels and pleasure craft if at least a twelve hour advance notice is given.

(548) (c) At all times, the draw shall open as soon as possible for public vessels of the United States, state or local government vessels used for public safety and vessels in distress.

(549) **§117.625 Black River.**

(550) (a) For all drawbridges across the Black River, notice requesting the opening of a draw may be given to the dispatcher of the Port Huron Police Department. Public vessels of the United States, state or local vessels used for public safety, and vessels in distress shall be passed through each drawbridge on the river as soon as possible.

(551) (b) The draws of the Military Street bridge, mile 0.3, and Seventh Street bridge, mile 0.5, both at Port Huron, shall open on signal; except that, from May 1 through October 31 from 9 a.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draw need be opened only on the hour and half hour and, from November 1 through November 30 and April 1 through April 30 from 4 p.m. to 8 a.m., the draw shall open if at least three hours notice is given. From December 1 through March 31, the draw shall open if at least 24 hours notice is given.

(552) (c) The draw of the Tenth Street bridge, mile 0.9 at Port Huron, shall open on signal–

(553) (1) From May 1 through October 31 from 8 a.m. to 11 p.m. and from 11 p.m. to 8 a.m., if at least one hours notice is given:

(554) (2) From April 1 through April 30 and November 1 through November 30, if at least three hours notice is given; and

(555) (3) From December 1 through March 31, if at least 24 hours notice is given.

(556) **§117.627 Cheboygan River.**

(557) The draw of the US 23 highway bridge, mile 0.9 at Cheboygan shall operate as follows:

(558) (a) From March 16 through May 15 and from September 16 through December 14, the draw shall open on signal.

(559) (b) From May 16 through September 15 -

(560) (1) Between the hours of 6 p.m. and 6 a.m., seven days a week, the draw shall open on signal.

(561) (2) Between the hours of 6 a.m. and 6 p.m., seven days a week, the draw need open only from three minutes before to three minutes after the quarter and three-quarters hour.

(562) (c) From December 15 through March 15, no bridgetender is required to be at the bridge and the draw need not open unless a request to open the draw is given to the Cheboygan Police Department at least 24 hours in advance of a vessel's time of intended passage through the draw.

(563) (d) At all times, the draw shall open as soon as possible for the passage of public vessels of the United States, State or local vessels used for public safety, commercial vessels, and vessels in distress.

(564) **§117.631 Detroit River (Trenton Channel).**

(565) (a) The draw of the Grosse Ile Toll bridge (Grosse Ile Parkway), mile 8.8, at Grosse Ile, shall operate as follows:

(566) (1) Between the hours of 7 a.m. and 11 p.m., seven days a week and holidays, the draw need open only from three minutes before to three minutes after the hour and half-hour for pleasure craft; for commercial vessels, during this period of time, the draw shall open on signal as soon as possible.

(567) (2) Between the hours of 11 p.m. and 7 a.m., the draw shall open on signal for pleasure craft and commercial vessels.

(568) (b) The draw of the Wayne County highway bridge (Bridge Road), mile 5.6, at Grosse Ile, shall operate as follows:

(569) (1) From March 16 through December 14-

(570) (i) Between the hours of 7 a.m. and 11 p.m., seven days a week and holidays, the draw need open only from three minutes before to three minutes after the quarter and three-quarter hour for pleasure craft, with no opening required at 7:45 a.m., 8:45 a.m., 4:15 p.m. and 5:15 p.m., Monday through Friday, except holidays; for commercial vessels, during these periods of time, the draw shall open on signal as soon as possible.

(571) (ii) Between the hours of 11 p.m. and 7 a.m., the draw shall open on signal for pleasure craft and commercial vessels.

(572) (2) From December 15 through March 15, no bridgetenders are required to be on duty at the bridge and the bridge shall open on signal if at least a twelve-hour advance notice is given.

(573) (c) At all times, the bridges listed in this section shall open as soon as possible for public vessels of the United States, State or local government vessels used for public safety and vessels in distress.

(574) **§117.633 Grand River.**

(575) (a) Public vessels of the United States, state or local vessels used for public safety, commercial vessels, and vessels in distress shall be passed through the draw of each bridge as soon as possible.

(576) (b) The draw of the CSX Transportation Corp. railroad bridge, mile 2.8 at Grand Haven, shall open on signal; except that, from December 15 through March 15, the draw shall open on signal if at least 12 hours notice is given.

(577) (c) The draw of the U.S. Route 31 bridge, mile 2.9 at Grand Haven, shall open on signal for pleasure craft–

(578) (1) From March 16 through December 14, from 6:30 a.m. to 8:30 p.m., seven days a week, once an hour, on the half-hour; except the draw need not open for pleasure craft at 7:30 a.m., 12:30 p.m., and 5:30 p.m. on Monday, Tuesday, Thursday, and Friday, and at 7:30 a.m., 12:30 p.m., and 4:30 p.m. on Wednesday.

(579) (2) From December 15 through March 15, if at least 12 hours notice is given.

(580) **§117.635 Keweenaw Waterway.**

(581) The draw of the US41 bridge, mile 16.0 between Houghton and Hancock, shall open on signal; except that, from January 1 through March 15, the draws shall open on signal if at least 24 hours notice is given.

(582) **§117.637 Manistee River.**

(583) (a) The draws of the Maple Street bridge, mile 1.1, and US-31 highway bridge, mile 1.4, both at Manistee, shall operate as follows:

(584) (1) From May 1 through October 31, between 7 a.m. to 11 p.m., the bridges shall open on signal. From 11 p.m. to 7 a.m., the bridges need not open unless notice is given at least two hours in advance of a vessel's time of intended passage through the draws.

(585) (2) From November 1 through April 30, the bridges need not open unless notice is given at least 24 hours in advance of a vessel's time of intended passage through the draws.

(586) (b) The CSX Transportation railroad bridge, mile 1.5, at Manistee, shall open on signal from May 1 to October 31. From November 1 to April 30, the bridge need not open unless notice is given at least 24 hours in advance of a vessel's time of intended passage through the draw.

(587) **§117.639 Ontonagon River.**

(588) The draw of the S64 bridge, mile 0.2 at Ontonagon, shall open on signal from April 1 through November 15 from 7 a.m. to 11 p.m. and from 11 p.m. to 7 a.m., if at least one hour notice is given. From November 16 through March 31, the draw shall open on signal if at least 24 hours notice is given.

(589) **§117.641 Pine River (Charlevoix).**

(590) The draw of the US31 bridge, mile 0.3 at Charlevoix, shall be operated as follows:

(591) (a) The draw shall open on signal; except that, from 6 a.m. to 6 p.m., the draw shall open on signal from three minutes before to three minutes after the hour and half hour. Public vessels of the United States, state or local vessels used for public safety, and vessels in distress shall be passed through the draw of each bridge as soon as possible.

(592) (b) The owners of the bridge shall provide and keep in good legible condition two board gages painted white with black figures not less than six inches high to indicate the vertical clearance under the closed draw at all stages of the tide. The gages shall be placed on the bridge so that they are plainly visible to operators of vessels approaching the bridge either up or downstream.

(593) **§117.643 Pine River (St. Clair).**

(594) The draw of the S29 bridge, mile 0.1 at St. Clair, shall open on signal from April 1 through November 30 from 2 a.m. to 8 a.m. and from 8 a.m. to 2 a.m. on the hour and one-half hour. From December 1 through March 31, the draw shall open on signal if at least 24 hours notice is given. Public vessels of the United States, state or local vessels used for public safety, and vessels in distress shall be passed through the draw as soon as possible.

(595) **§117.647 Saginaw River.**

(596) (a) The draws of the Detroit and Mackinac railroad bridge, mile 2.5 at Bay City, and the Conrail railroad bridge, mile 4.4 at Bay city, shall open on signal; except that, from December 16 through March 15, the draws shall open on signal if at least 12 hours notice is given.

(597) (b) The draws of the Belinda Street (Independence) bridge, mile 3.3, Veterans Memorial Bridge, mile 5.0 and Lafayette Street bridge, mile 6.2, all in Bay City, shall open on signal from March 16 through December 15, except as follows:

(598) (1) From 6:30 a.m. to 8:30 a.m. and 3:30 p.m. to 5:30 p.m., except Saturdays, Sundays, and holidays observed in the locality, the draws need not be opened for the passage of vessels of less than 50 gross tons.

(599) (2) From 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. except on Sundays and Federal holidays, the draws need not be opened for the passage of downbound vessels of over 50 gross tons.

(600) (3) From 8 a.m. to 8 p.m. on Saturdays, Sundays, and Federal holidays, the draws of the Belinda Street and Lafayette Street bridges need not be opened for the passage of pleasure craft except from three minutes before to three minutes after the hour and half hour.

(601) (4) From 8 a.m. to 8 p.m. on Saturdays, Sundays, and Federal holidays, the draws of the Veterans Memorial bridge need not be opened for the passage of pleasure craft, except from three minutes before to three minutes after the quarter hour and three quarter hour.

(602) (5) From December 16 through March 15, the draws of these bridges shall open on signal if at least 12 hours notice is given.

(603) (c) The draw of the Sixth Avenue bridge, mile 17.1 at Saginaw, shall open on signal from April 1 through November 15 from 7 a.m. to 11 p.m. At all other times, the draw shall open on signal if at least three hours notice is given.

(604) (d) The draw of the CSX railroad bridge, mile 18.0, need not be opened for the passage of vessels. The owner shall return the draw to an operable condition within a reasonable time when directed by the District Commander to do so.

(605) (e) The draw of the Grand Trunk Western railroad bridge, mile 19.2, need not be opened for the passage of vessels.

(606) **§117.651 St. Joseph River.**

(607) The draws of the M-63 (Blossomland) bridge, mile 0.9, and the BL-94 (Bicentennial) bridge, mile 1.3, both at St. Joseph, shall be operated as follows:

(608) (a) From March 1 through May 14, from October 1 through December 15, and from 8 p.m. to 7 a.m. from May 15 through September 30, the draws shall open on signal.

(609) (b) From 7 a.m. to 8 p.m. from May 15 through September 30, the draw of the Blossomland bridge need be opened only from three minutes before to three minutes after the hour and half hour, and the draw of the Bicentennial bridge need be opened only from three minutes before to three minutes after the quarter and three-quarter hour.

(610) (c) From December 16 through the last day of February, the draw of both bridges shall open on signal if at least 12 hours notice is given.

(611) (d) Public vessels of the United States, state and local government vessels used for public safety, commercial vessels, and vessels in distress shall be passed through the draw of both bridges as soon as possible.

(612) **§117.653 St. Marys Falls Canal.**

(613) The draw of the International Railway bridge, mile 1.0 at Sault Ste. Marie, shall be maintained in the fully open position during the navigation season, except for the crossings of trains or for maintenance. Bridge operators shall not give precedence to railway traffic and shall not close the bridge against an upbound vessel after lock gates are open and the vessel is proceeding toward the bridge, nor against a downbound vessel, 1,200 feet or less west of the bridge, unless the vessel is moored at either canal pier awaiting its turn to take position at lock approaches.

(614) **§117.655 Thunder Bay River.**

(615) The draw of the Second Avenue bridge, mile 0.3 at Alpena, shall open on signal if at least three hours notice is given to the Dispatcher, Police Department, City of Alpena, Michigan.

(616) **MINNESOTA**

(617) **§117.661 Duluth Ship Canal (Duluth-Superior Harbor).**

(618) The draw of the Duluth Ship Canal bridge, mile 0.1 at Duluth, shall open on signal; except that, from January 1 through March 15, the draw shall open on signal if at least 24 hours notice is given. The opening signal is one prolonged blast, one short blast, one prolonged blast, one short blast. If the Duluth Ship Canal Bridge is disabled, the bridge authorities shall give incoming and outgoing vessels timely and dependable notice, by tug service if necessary, so that the vessels do not attempt to enter the canal. Vessels shall be given precedence over highway or railway traffic at all times.

(619) **§117.669 St. Louis River (Duluth Superior Harbor).**

(620) (a) The draws of the Burlington Northern railroad bridge, mile 5.7, shall open on signal; except that, from January 1 through March 15, the draws shall open on signal if at least 24 hours notice is given. The opening signal for the Minnesota draw is one prolonged blast followed by two short blasts and for the Wisconsin draw is two prolonged blasts followed by two short blasts.

(621) (b) The draws of the Grassy Point bridge, mile 8.0, and the Arrow Head bridge, mile 8.7, shall open on signal; except that, from January 1 through March 15, the draw shall open on signal if at least 24 hours notice is given. The opening signal for the Grassy Point bridge is two prolonged blasts followed by one short blast and for the Arrowhead bridge is three prolonged blasts.

(622) (c) The draw of the Duluth Missabe and Iron Range Railway bridge, mile 16.3, need not be opened for the passage of vessels. The owner shall return the draw to operable condition within a reasonable time when notified by the District Commander to do so.

(623) **NEW YORK**

(624) **§117.769 Black Rock Canal.**

(625) The draws of the Ferry Street bridge, mile 2.6, and Canadian National Railway bridge, mile 3.8, both at Buffalo, shall operate as follows:

(626) (a) From April 15 through November 30, the draws shall open on signal. However, between the hours of 12 midnight and 8 a.m., seven days a week, no bridgetender is required to be in attendance at the bridges and the draws shall open on signal if notice is given to the owners at least two hours in advance of a vessel's intended time of passage through the draws.

(627) (b) From December 1 through April 14, no bridgetender is required to be in attendance at the bridges and the draws shall open on signal if notice is given to the owners at least four hours in advance of a vessel's time of intended passage through the draws.

(628) **§117.773 Buffalo River.**

(629) (a) The draw of the Michigan Avenue bridge, mile 1.3, at Buffalo, shall operate as follows:

(630) (1) From March 22 through December 15, the draw shall open within 20 minutes of signal. However, the draw need not open from 7:30 a.m. to 9 a.m., and from 4 p.m. to 5:45 p.m., Monday through Saturday.

(631) (2) From December 16 through March 21, the draw shall open on signal if notice is given at least 4 hours in advance of a vessel's time of intended passage through the draw.

(632) (b) The draw of the Ohio Street bridge, mile 2.1, at Buffalo, shall operate as follows:

(633) (1) From March 22 through December 15, the draw shall open on signal within 20 minutes after a request is made to the Michigan Avenue drawtender. However, the draw need not open from 7:30 a.m. to 9 a.m., and from 4 p.m. to 5:45 p.m., Monday through Saturday.

(634) (2) From December 16 through March 21, the draw shall open on signal if notice is given at least 4 hours in advance of a vessel's time of intended passage through the draw.

(635) (3) In addition to the standard signals required for requesting the bridge to open, the owners of this bridge shall maintain and monitor a marine radiotelephone for use by the Michigan Avenue drawtender for receiving requests for opening the Ohio Street bridge. The drawtender shall maintain communications with any transiting vessel until the vessel has cleared both the Ohio Street and Michigan Avenue draws.

(636) (c) The draws of the CSX Transportation railroad bridges, miles 4.02 and 4.39, both at Buffalo, shall open on signal if notice is given at least 4 hours in advance of a vessel's time of intended passage through the draws.

(637) (d) The South Park Avenue bridge, mile 5.3 at Buffalo, shall open on signal if notice is given at least 4 hours in advance of a vessel's time of intended passage through the draw. However, the draw need not open from 7 a.m. to 8:30 a.m., and from 4:30 p.m. to 6 p.m., Monday through Saturday.

(638) (e) The periods when the bridges need not open on signal prescribed in paragraphs (a)(1), (b)(1), and (d) in this section shall not be effective on Sundays, and on New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day, or days observed in lieu of any of these under State law.

(639) **§117.785 Genessee River.**

(640) (a) The following applies to all bridges listed in this section:

(641) (1) At all times, public vessels of the United States, vessels in distress, and vessels seeking shelter from rough weather shall be passed through the bridges as soon as possible.

(642) (2) Clearance gages of a type approved by the Commander, Ninth Coast Guard District, shall be installed on the upstream and downstream sides of each drawbridge by and at the expense of the owner of or agency controlling the bridge and the gages shall be kept in good repair and legible condition.

(643) (b) The draw of the CSX Transportation bridge, mile 0.9 at Rochester, shallopen on signal; except that, from December 15 through March 31, the draw shall open on signal if at least 12 hours notice is given.

(644) (c) The draw of the Stutson Street bridge, mile 1.2 at Rochester, shall open on signal from April 1 through December 15; however, from 7 a.m. to 9 a.m. and from 4 p.m. to 6 p.m. Monday through Friday except Federal holidays, the draw need be opened only for the passage of commercial vessels. From 9 a.m. to 4 p.m. and 6 p.m. to 11 p.m. Monday through Friday except Federal holidays, and from 7 a.m. to 11 p.m. on Saturdays, Sundays, and Federal holidays, the draw need be opened only on the hour and half hour, except that commercial vessels shall be passed at any time. From December 16 through March 31, the draw shall open on signal if at least 12 hours notice is given.

(645) **§117.791 Hudson River.**

(646) (a) The draws of the bridges listed in this section shall open as soon as possible at any time for the passage of the following vessels:

(647) (1) Downbound vessels during a freshet of a height exceeding an elevation determined by the District Commander.

(648) (2) Public vessels of the United States.

(649) (3) State or local vessels used for public safety.

(650) (4) Vessels of 500 tons or more.

(651) (5) Tugs with a tow on a hawser.

(652) (b) The draws of the bridges listed in this section shall not remain open for more than 15 minutes and may remain closed for up to 10 minutes to allow accumulated land traffic to pass.

(653) (c) The draw of the CSX Transportation bridge, mile 146.2 between Albany and Rensselaer, shall open on signal; except that, from December 16 through March 31, the draw shall open on signal if at least 24 hours notice is given.

(654) (d) The draw of the state highway bridge, mile 150.2 between Troy and Menands, need not be opened for the passage of vessels.

(655) (e) The draw of the highway bridge, mile 152.7 between Troy and Green Island, operates as follows:

(656) (1) From April 1 through December 15, the draw shall open on signal from 9 a.m. to 4 p.m.; except that, the draw need not be opened from 6 p.m. to 7 a.m., unless notice is given before 4:30 p.m. to the time the vessel is expected to pass, and need not open from 7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.

(657) (2) From December 16 through March 31, the draw need not be opened.

(658) (f) The draws of the 112th Street bridge, mile 155.4 between Troy and Cohoes operate as follows:

(659) (1) The draws shall open on signal from 9 a.m. to 4 p.m.

(660) (2) The draws shall open on signal from 6 p.m. to 7 a.m., if notice is given, before 4:30 p.m., of the time the vessel is expected to pass.

(661) (3) The draws need not be opened from 7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.

(662) (4) During the period that the Federal lock at Troy is inoperative, the draws need not be opened for the passage of vessels, provided that emergency opening be made as soon as possible.

(663) **§117.797 Lake Champlain.**

(664) (a) The draw of each bridge listed in this section shall open as soon as possible for public vessels of the United States and vessels of the Vermont Fish and Game Department.

(665) (b) The draw of the US2 Bridge, mile 91.8, over Lake Champlain, between South Hero Island and North Hero Island, shall operate as follows:

(666) (1) The draw shall open on signal on the hour and the half hour from May 15th through October 15th from 8 a.m. to 8 p.m. daily.

(667) (2) The draw shall open on signal from May 15th through October 15th from 8 p.m. to 8 a.m. if at least four hours notice is given by calling the number posted at the bridge.

(668) (3) The draw shall open on signal from October 16th through May 14th if at least four hours notice is given by calling the number posted at the bridge.

(669) (c) The draw of the Central Vermont Railway bridge across Missisquoi Bay, mile 105.6 shall open on signal:

(670) (1) From June 15 through September 15;

(671) (i) Monday through Friday from 9 a.m. to 5 p.m.;

(672) (ii) Saturdays, Sundays, Independence Day and Labor Day from 7 a.m. to 11 p.m.;

(673) (iii) At all other times, if at least two hours notice is given.

(674) (2) From September 16 through June 14, if at least 24 hours notice is given.

(675) (d) The draw of the SR78 bridge, mile 105.9 across the entrance to Missisquoi Bay between Alburg Tongue and Hog Island at East Alburg, shall open on signal if at least 24 hours notice is given.

(676) **§117.803 Niagara River.**

(677) The draw of the Canadian National Railway bridge, mile 33.0 at Buffalo, need not be opened for the passage of vessels.

(678) **§117.809 Tonawanda Creek.**

(679) The draw of the Penn Central Corporation railroad bridge, mile 0.1 at Tonawanda, is permanently maintained in the open position.

(680) **§117.811 Tonawanda Harbor.**

(681) The draw of the Tonawanda Island Railroad bridge, mile 0.2 between North Tonawanda and Tonawanda Island, shall open on signal if at least 24 hours notice is given.

(682) **OHIO**

(683) **§117.847 Ashtabula River.**

(684) (a) The draw of the Fifth Street bridge, mile 1.4 at Ashtabula, shall open on signal for the passage of commercial and emergency vessels and on the hour and half hour for all other vessels.

(685) (b) The draw of the Norfolk Southern bridge, mile 1.5 at Ashtabula, shall open on signal from April 1 through November 30 from 7 a.m. to 11 p.m. At all other times the draw shall open on signal if at least 24 hours notice is given.

(686) **§117.850 Black River.**

(687) The draw of the Erie Avenue bridge, mile 0.6, at Lorain shall open on signal except as follows:

(688) (a) From April 1 through December 31–

(689) (1) From 7 a.m. to 6 p.1m., Monday through Friday, except legal holidays, the draw need open only on the hour and half-hour for pleasure craft; however, the draw need not open for pleasure craft at 8 a.m., 3 p.m., 4 p.m. and 5 p.m. For commercial vessels the draw shall open on signal as soon as possible.

(690) (2) From 11 a.m. to 6 p.m., Saturdays, Sundays and legal holidays, the draw need open only on the hour and half-hour for pleasure craft. For commercial vessels the draw shall open on signal as soon as possible.

(691) (3) From 11 p.m. to 7 a.m., seven days a week and legal holidays, no bridgetender is required to be in constant attendance and the bridge shall open on signal for pleasure craft and commercial vessels if at least a one hour advance notice is given.

(692) (b) From January 1 through March 31, the draw shall open on signal for pleasure craft and commercial vessels if at least a twelve hour advance notice is given.

(693) (c) At all times, the draw shall open as soon as possible for public vessels of the United States, state or local government vessels used for public safety and vessels in distress.

(694) **§117.851 Portage River.**

(695) (a) Public vessels of the United States, State or local vessels used for public safety, commercial vessels, and vessels in distress or seeking shelter from rough weather shall be passed through the bridges listed in this section as soon as possible.

(696) (b) The owners of the bridges listed in this section shall provide and keep in good legible condition two board gages painted white with black figures to indicate the vertical clearance under the closed draw at all stages of the tide. The gages shall be so placed on the bridge that they are plainly visible to operators of vessels approaching the bridge either up or downstream.

(697) (c) The draws of the Monroe Street bridge, mile 0.4 at Port Clinton, shall open as follows:

(698) (1) From May 1 through May 14 and from November 1 through December 1, the draw shall open on signal.

(699) (2) From May 15 through October 31 from 12 midnight to 6 a.m., the draw shall open on signal; except that, from 6 a.m. to 12 midnight the draw shall open on signal only from three minutes before to three minutes after the hour and half hour.

(700) (3) From December 2 through April 30, the draw shall open on signal if at least 24 hours notice is given.

(701) (d) The draws of the Norfolk Southern bridge, mile 1.5 at Port Clinton, shall open on signal; except that, from December 2 through April 30, the draw shall open on signal if at least 24 hours notice is given.

(702) **§117.853 Sandusky Bay.**

(703) (a) The draw of the Norfolk Southern bridge, mile 3.5 at Sandusky, shall open on signal from April 1 through October 31 and from November 1 through November 30 from 8 a.m. to 4 p.m. At all other times, the draw shall open on signal if at least 24 hours notice is given to the Chief Dispatcher, Central Union Terminal, Toledo.

(704) **§117.855 Maumee River.**

(705) (a) The draw of the Craig Memorial highway bridge, mile 3.30, at Toledo, shall operate as follows:

(706) (1) From April through December 20–

(707) (i) Between the hours of 7 a.m. and 11 p.m., the draw need open only from three minutes before to three minutes after the hour and half-hour with no opening required at 7:30 a.m. and 4:30 p.m. for pleasure craft; for commercial vessels, during this period of time, the draw shall open on signal as soon as possible.

(708) (ii) Between the hours of 11 p.m. and 7 a.m., the draw shall open on signal for commercial vessels and pleasure craft.

(709) (2) From December 21 through March 31, no bridgetenders are required to be on duty at the bridge and the draw shall open on signal from December 21 through December 31, if at least a four hour advance notice is given and from January 1 through March 31, if at least a twelve hour advance notice is given.

(710) (b) The draw of the Martin Luther King, Jr. Memorial Highway Bridge (Cherry Street), mile 4.30 at Toledo, shall operate as follows:

(711) (1) From April 1 through December 20–

(712) (j) Between the hours of 7 a.m. and 11 p.m., the draw need open only from three minutes before to three minutes after the quarter and three-quarter hour with no opening required at 7:45 a.m. and 4:45 p.m. for pleasure craft; for commercial vessels, during this period of time, the draw shall open on signal as soon as possible.

(713) (ii) Between the hours of 11 p.m. and 7 a.m., the draw shall open on signal for commercial vessels and pleasure craft.

(714) (2) From December 21 through March 31, no bridgetenders are required to be at the bridge and the draw shall open on signal from December 21 through December 31, if at least a four hour advance notice is given and from January 1 through March 31, if at least a twelve hour advance notice is given.

(715) (c) The draws of the CSX Transportation railroad bridge mile 1.07, Norfolk Southern railroad bridge, mile 1.80 and Norfolk Southern railroad bridge, mile 5.76, all at Toledo, shall operate as follows:

(716) (1) From April 1 through December 20, the draws shall open on signal for all vessels.

(717) (2) From December 21 through March 31, no bridgetenders are required to be at the bridges and the draws shall open on signal for commercial vessels and pleasure craft from December 21 through December 31, if at least a four hour advance notice is given and from January 1 through March 31, if at least a twelve hour advance notice is given.

(718) (d) At all times, the bridges listed in this section shall open as soon as possible for public vessels of the United States, state or local government vessels used for public safety and vessels in distress.

(719) **VERMONT**

(720) **§117.993 Lake Champlain.**

(721) (a) The draws of the bridges listed in this section shall open as soon as possible for the passage of public vessels of the United States and Vermont Fish and Game Department vessels.

(722) (b) The draw of the US2 Bridge, mile 91.8, over Lake Champlain, between South Hero Island and North Hero Island, shall operate as follows:

(723) (1) The draw shall open on signal on the hour and the half hour from May 15th through October 15th from 8 a.m. to 8 p.m. daily.

(724) (2) The draw shall open on signal from May 15th through October 15th from 8 p.m. to 8 a.m. if at least four hours notice is given by calling the number posted at the bridge.

(725) (3) The draw shall open on signal from October 16th through May 14th if at least four hours notice is given by calling the number posted at the bridge.

(726) (c) The draw of the Central Vermont Railway bridge across Missisquoi Bay, mile 105.6 shall open on signal:

(727) (1) From June 15 through September 15;

(728) (i) Monday through Friday from 9 a.m. to 5 p.m.;

(729) (ii) Saturdays, Sundays, Independence Day and Labor Day from 7 a.m. to 11 p.m.;

(730) (iii) At all other times, if at least two hours notice is given.

(731) (2) From September 16 through June 14, if at least 24 hours notice is given.

(732) (d) The draw of the SR78 bridge, mile 105.9 between Alburg Tongue and East Alburg, shall open on signal if at least 24 hours notice is given.

(733) **WISCONSIN**

(734) **§117.1083 Duluth-Superior Harbor (St. Louis River).**

(735) (a) The draws of the Burlington Northern railroad bridge, mile 5.7 at Duluth, shall open on signal; except that, from January 1 through March 15, the draws shall open on signal if at least 24 hours notice is given. The opening signal for the Minnesota draw is one prolonged blast followed by two short blasts and for the Wisconsin draw is two prolonged blasts followed by two short blasts.

(736) (b) The draws of the Grassy Point bridge, mile 8.0 at Duluth, and the Arrowhead bridge, mile 8.7 at Duluth, shall open on signal; except that, from January 1 through March 15, the draws shall open on signal if at least 24 hours notice is given. The opening signal for the Grassy Point bridge is two short blasts followed by one prolonged blast and for the Arrowhead bridge is three prolonged blasts.

(737) (c) The draw of the Duluth, Missabe and Iron Range Railway bridge, mile 16.3 at Duluth, need not be opened for the passage of vessels. The owner shall return the draw to operable condition within a reasonable time when notified by the District Commander to do so.

(738) **§117.1085 East River.**

(739) The draw of the Monroe Avenue bridge, mile 0.3 at Green Bay, need not be opened for the passage of vessels.

(740) **§117.1087 Fox River.**

(741) (a) The draws of the Main Street bridge, mile 1.6, Walnut Street bridge, mile 1.8, and Mason Street bridge, mile 2.2, all at Green Bay, need not be opened for the passage of vessels from 7 a.m. to 8 a.m., 12 noon to 1 p.m., and 4 p.m. to 5 p.m. Monday through Saturday except Federal holidays. Public vessels of the United States, tugs, fireboats, and vessels with a cargo capacity of 300 short tons or over engaged in commercial transportation shall be passed at any time. The opening signal for the Main Street bridge is two short blasts followed by one prolonged blast, for the Walnut Street bridge one prolonged blast followed by two short blasts, and for the Mason Street bridge one prolonged blast, followed by one short blast, followed by one prolonged blast.

(742) (b) The draw of the George Street bridge, mile 7.2 at DePere, shall open on signal during the navigation season; except that, from 6 p.m. to 8 a.m. during the navigation season, the draw shall open on signal if at least two hours notice is given.

(743) (c) The draws of the Main Street bridge, mile 56.3, Jackson Street bridge, mile 56.5, Wisconsin Street bridge, mile 57.0, and the Congress Avenue bridge, mile 58.3 all at Oshkosh, shall open on signal from 8 a.m. to 12 midnight; except that, from Monday through Friday from 11:45 a.m. to 12:15 p.m., 12:45 p.m. to 1:15 p.m., and 3 p.m. to 5 p.m., the draws need not be opened for other than public vessels of the United States except on Memorial Day, Independence Day, and Labor Day. From 12 midnight to 8 a.m., the draws shall open on signal if at least two hours notice is given by radiotelephone to the Main Street bridge drawtender or the Winnebago County Sheriff's Department.

(744) (d) The draw of each bridge at or between Berlin and Portage need not open for the passage of vessels.

(745) **§117.1089 Manitowoc River.**

(746) (a) The draws of the Eighth Street bridge, mile 0.3, and the Tenth Street bridge, mile 0.5, both at Manitowoc, shall open on signal Monday through Friday except Saturdays, Sundays, New Year's Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day or on the Monday following these holidays when they occur on a Sunday. The draws need not be opened from 6:50 a.m. to 7 a.m., 7:50 a.m. to 8 a.m., 11:55 a.m. to 12:10 p.m., and 12:45 p.m. to 1 p.m. The opening signal for the Eighth Street bridge is one prolonged blast followed by one short blast and for the Tenth Street bridge is two short blasts followed by one prolonged blast. When signal is given by a car ferry or other large vessel to open either bridge, the remaining bridge shall also be opened promptly so that the vessel is not held between the two bridges.

(747) (b) The draw of the Soo Line railroad bridge, mile 0.9 shall open on the signal of two short blasts followed by one prolonged blast.

(748) **§117.1091 Menominee River.**

(749) The draw of the Ogden-First Street bridge, mile 0.4 at Marinette, shall open on signal from 7 a.m. to 11 p.m. from May 1 through October 31. From 11 p.m. to 7 a.m. from May 1 through October 31, the draw shall open on signal if at least two hours notice is given. From November 1 through April 30, the draw shall open on signal if at least 12 hours notice is given.

(750) **§117.1093 Milwaukee, Menomonee, and Kinnickinnic Rivers and South Menomonee and Burnham Canals.**

(751) (a) The draws of each bridge listed in this section shall open as soon as possible for the passage of public vessels of the United States, vessels carrying United States mail, vessels

licensed to carry 50 or more passengers when on their regular routes, and fireboats of the City of Milwaukee.

(752) (b) For all bridges, the drawtender's acknowledging signal when the draw will open is the same as the opening signal. The acknowledging signal when the draw will not open, or is open and must be closed promptly is four short blasts.

(753) (c) The draws of bridges across the Milwaukee River operate as follows:

(754) (1) The draws of the North Broadway Street bridge, mile 0.5, North Water Street bridge, mile 0.6, and Michigan Street bridge, mile 1.1, all at Milwaukee, shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday exceptFederal holidays, the draws need not be opened.

(755) (2) The draws of all other bridges across the Milwaukee River shall open on signal if at least two hours notice is given; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m., the draws need not be opened.

(756) (3) The opening signals are as follows:

(757) (i) The Chicago and Northwestern bridge, mile 0.3, two prolonged blasts.

(758) (ii) The North Broadway Street bridge, mile 0.5, three prolonged blasts followed by one short blast.

(759) (iii) The North Water Street bridge, mile 0.6, three prolonged blasts followed by two short blasts.

(760) (d) The draws of bridges across the Menomonee River and South Menomonee Canal operate as follows:

(761) (1) The draw of the North Plankinton Avenue bridge across the Menomonee River, mile 0.1, shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened.

(762) (2) The draws of all other bridges across the Menomonee River and South Menomonee Canal shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened and, from 11 p.m. to 7 a.m., the draws shall open on signal if at least two hours notice is given.

(763) (3) The opening signal for the Chicago, Milwaukee, St. Paul and Pacific railroad bridge across the Menomonee River, mile 0.1, is two prolonged blasts followed by two short blasts.

(764) (e) The draws of bridges across the Kinnickinnic River operate as follows:

(765) (1) The draw of the Kinnickinnic Avenue bridge, mile 1.5, shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draw need not be opened.

(766) (2) The draws of the Chicago, Milwaukee, St. Paul and Pacific railroad bridge, mile 1.5, and the Chicago and Northwestern Railway bridge, mile 1.52, shall open on signal if at least two hours notice is given.

(767) (3) The draws of all other bridges across the Kinnickinnic River shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened and, from 11 p.m. to 7 a.m., the draws shall open on signal if at least two hours notice is given.

(768) (4) The opening signal for the Chicago and Northwestern bridge, mile 1.0, is two prolonged blasts.

(769) (f) The draws of bridges across the Burnham Canal operate as follows:

(770) (1) The draw of the Chicago, Milwaukee, St. Paul and Pacific railroad bridge, mile 0.8, shall open on signal if at least two hours notice is given.

(771) (2) The draws of all other bridges across the Burnham Canal shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened and, from 11 p.m. to 7 a.m., the draws shall open on signal if at least two hours notice is given.

(772) **§117.1095 Root River.**

(773) (a) The draw of the Main Street bridge, mile 0.3 shall open on signal; except that, from April 1 through December 1 from 6 a.m. to 6 p.m., the draw need be opened only on the hour, 20 minutes after the hour, and 40 minutes after the hour to pass all accumulated vessels; and, from December 2 through March 31, the draw shall open on signal if at least two hours notice is given. At all times, public vessels of the United States, state or local vessels used for public safety, commercial vessels, and vessels in distress shall be passed as soon as possible.

(774) (b) The draw of the State Street bridge, mile 0.5, shall open on signal; except that, from October 16 through April 30, the draw shall open on signal if at least two hours notice is given. At all times, public vessels of the United States, state or local vessels used for public safety, commercial vessels, and vessels in distress shall be passed as soon as possible.

(775) **§117.1097 Sheboygan River.**

(776) The draw of the Eighth Street bridge, mile 0.69 at Sheboygan, shall open as follows:

(777) (a) From May 1 through October 31–

(778) (1) Between the hours of 6 a.m. and 10 p.m., the bridge shall open on signal, except that:

(779) (i) From 6:10 a.m. to 7:10 p.m., Monday through Saturday, the draw need open only at 10 minutes after the hour, on the half-hour, and 10 minutes before the hour; and

(780) (ii) From Monday through Friday, except Federal holidays, the draw need not open between 7:30 a.m. and 8:30 a.m., between 12 p.m. and 1 p.m., and between 4:30 p.m. and 5:30 p.m.

(781) (2) Between the hours of 10 p.m. and 6 a.m., the draw shall open on signal if at least 2 hours advance notice is provided.

(782) (b) From November 1 through April 30, the draw shall open on signal if at least 12 hours advance notice is provided.

(783) (c) At all times, the draw shall open as soon as possible for pubic vessels of the United States, state or local government vessels used for public safety, vessels in distress, vessels seeking shelter from rough weather, or any other emergency.

(784) **§117.1101 Sturgeon Bay.**

(785) The draw of the Michigan Street highway bridge, mile 4.[illegible] at Sturgeon Bay, shall open as follows:

(786) (a) From March 15 through December 31–

(787) (1) The draw need open on signal for recreational vessels only on the hour, 24 hours a day. However, if more than 20 vessels have accumulated at the bridge, the draw shall open as soon as possible.

(788) (2) Between the hours of 6 p.m. and 10 p.m., the draw need open for recreational vessels only on the hour and half-hour.

(789) (3) Between the hours of 10 p.m. and 8 a.m., the draw shall open on signal.

(790) (b) The draw shall open on signal for commercial vessels. Additionally, the draw shall open on signal for all vessels seeking shelter from severe weather.

(791) (c) From January 1 through March 14, the draw shall open on signal if notice is given at least 12 hours in advance of a vessel's time of intended passage through the draw.

(792) **§117.1107 Wolf River.**

(793) The draw of the Winneconne highway bridge, mile 2.4 at Winneconne, shall open on signal; except that, from 11 p.m. to 7 a.m. from May 1 through October 31, at least two hours notice is required and, from November 1 through April 30, at least 12 hours notice is required. At all times, public vessels of the United States, state and local vessels used for public safety, and vessels in distress shall be passed as soon as possible.

(794) **Note.**–Call signs and radio channels for drawbridges equipped with radiotelephones are included with the bridge descriptions in chapters 4 through 14.

## PART 151–VESSELS CARRYING OIL, NOXIOUS LIQUID SUBSTANCES, GARBAGE, MUNICIPAL OR COMMERCIAL WASTE, AND BALLAST WATER

### Subpart C–Ballast Water Management for Control of Nonindigenous Species

(795) **§151.1500 Purpose.**

(796) The purpose of this subpart is to implement the provisions of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 U.S.C. 4701 et seq.).

(797) **§151.1502 Applicability.**

(798) This subpart applies to each vessel that carries ballast water and that after operating on the waters beyond the Exclusive Economic Zone during any part of its voyage enters Snell Lock, at Massena, New York, or navigates north of the George Washington Bridge on the Hudson River, regardless of other port calls in the United States or Canada during that voyage.

(799) **§151.1504 Definitions.**

(800) The following terms are defined as used in this subpart.

(801) Ballast water means any water used to manipulate the draft, trim, or stability of a vessel, regardless of how it is carried on the vessel.

(802) Captain of the Port (COTP) means the Coast Guard officer designated as COTP of either the Buffalo, NY, Marine Inspection Zone and Captain of the Port Zone or the New York, NY, Captain of the Port Zone described in part 3 of this chapter or an official designated by the COTP.

(803) Commandant means the Commandant of the Coast Guard or an authorized representative.

(804) Exclusive Economic Zone (EEZ) means the area established by Presidential Proclamation Number 5030, dated March 10, 1983, (48 FR 10605, 3 cfr, 1983 Comp., p. 22), which extends from the base line of the territorial sea of the United States seaward 200 miles, and the equivalent zones of Canada.

(805) Environmentally sound method means methods, efforts, actions, or programs, either to prevent introductions or to control infestations of aquatic nuisance species, that minimize adverse effects on non-target organisms and ecosystems, and that emphasize integrated pest management techniques and non-chemical measures.

(806) Great Lakes means Lake Ontario, Lake Erie, Lake Huron (including Lake Saint Clair), Lake Michigan, Lake Superior, and the connecting channels (Saint Mary's River, Saint Clair River, Detroit River, Niagara River, and Saint Lawrence River to the Canadian border), and includes all other bodies of water within the drainage basin of such lakes and connecting channels.

(807) Port means a terminal or group of terminals or any place or facility that has been designated as a port by the COTP.

(808) Voyage means any transit by a vessel destined for the Great Lakes or the Hudson River, north of the George Washington Bridge, from a port or place outside of the EEZ, including intermediate stops at a port of place within the EEZ.

(809) **§151.1506 Restriction on operation.**

(810) No vessel subject to the requirements of this subpart may be operated in the Great Lakes or the Hudson River, north of the George Washington Bridge, unless the master of the vessel has certified, in accordance with §151.1516, that the requirements of this subpart have been met.

(811) **§151.1508 Revocation of clearance.**

(812) A COTP may request the District Director of Customs to withhold or revoke the clearance required by 46 U.S.C. appp. 91 for a vessel subject to this subpart, the owner or operator of which is not in compliance with the requirements of this subpart.

(813) **§151.1510 Ballast water management.**

(814) (a) The master of each vessel subject to this subpart shall employ one of the following ballast water management practices:

(815) (1) Carry out an exchange of ballast water on the waters beyond the EEZ, in a depth exceeding 2000 meters, prior to entry into the Snell Lock, at Massena, New York, or prior to navigating on the Hudson River, north of the George Washington Bridge, such that, at the conclusion of the exchange, any tank from which ballast water will be discharged contains water with a minimum salinity level of 30 parts per thousand.

(816) (2) Retain the vessel's ballast water on board the vessel. If this method of ballast water management is employed, the COTP may seal any tank or hold containing ballast water on board the vessel for the duration of the voyage within the waters of the Great Lakes or the Hudson River, north of the George Washington Bridge.

(817) (3) Use an alternative environmentally sound method of ballast water management that has been submitted to, and approved by, the Commandant prior to the vessel's voyage, Requests for approval of alternative ballast water management methods must be submitted to the Commandant (G-M), U.S. Coast Guard Headquarters, 2100 Second Street SW., Washington, DC 20593-0001.

(818) (b) No master of a vessel subject to this subpart shall separately discharge sediment from tanks or holds containing ballast water unless it is disposed of ashore in accordance with local requirements.

(819) (c) Nothing in this subpart authorizes the discharge of oil or noxious liquid substances (NLSs) in a manner prohibited by United States or international laws or regulations. Ballast water carried in any tank containing a residue of oil, NLSs, or any other pollutant must be discharged in accordance with the applicable regulations. Nothing in this subpart affects or supersedes any requirement or prohibitions pertaining to the discharge of ballast water into the waters of the United States under the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.).

(820) **§151.1512 Vessel safety.**

(821) Nothing in this subpart relieves the master of the responsibility for ensuring the safety and stability of the vessel or the safety of the crew and passengers, or any other responsibility.

(822) **§151.1514 Ballast water management alternatives under extraordinary conditions.**

(823) The master of any vessel subject to this subpart who, due to weather, equipment failure, or other extraordinary conditions, is unable to effect a ballast water exchange before entering the EEZ, must employ another method of ballast water management listed in §151.1510, or request from the COTP permission to exchange the vessel's ballast water within an area agreed to by the COTP at the time of the request and must discharge the vessel's ballast water within that designated area.

(824) **§151.1516 Compliance monitoring.**

(825) (a) the master of each vessel subject to this subpart shall provide, upon request, the following information, in written form, to the COTP:

(826) (1) The vessel's name, port of registry, and official number or call sign.

(827) (2) The name of the vessel's owner(s).

(828) (3) Whether ballast water is being carried.

(829) (4) The original location and salinity, if known, of ballast water taken on, before an exchange.

(830) (5) The location, date, and time of any ballast water exchange.

(831) (6) The salinity of any ballast water to be discharged into the territorial waters of the United States.

(832) (7) The intended discharge port for ballast water and location for disposal of sediment carried upon entry into the territorial water of the United States, if ballast water or sediment are to be discharged.

(833) (8) The signature of the master attesting to the accuracy of the information provided and certifying compliance with the requirements of this subpart.

(834) (b) The COTP may take samples of ballast water to assess the compliance with, and the effectiveness of, this subpart.

## Part 160–Ports and Waterways Safety-General

### Subpart A–General

(835) **§160.1 Purpose.**

(836) (a) Part 160 contains regulations implementing the Ports and Waterways Safety Act (33 U.S.C. 1221) and related statutes.

(837) **§160.3 Definitions.**

(838) For the purposes of this subchapter:

(839) "Bulk" means material in any quantity that is shipped, stored, or handled without the benefit of package, label, mark or count and carried in integral or fixed independent tanks.

(840) "Captain of the Port" means the Coast Guard officer designated by the Commandant to command a Captain of the Port Zone as described in part 3 of this chapter.

(841) "Commandant" means the Commandant of the United States Coast Guard.

(842) "Commanding Officer, Vessel Traffic Services" means the Coast Guard officer designated by the Commandant to command a Vessel Traffic Service (VTS) as described in part 161 of this chapter.

(843) "Deviation" means any departure from any rule in this subchapter.

(844) "District Commander" means the Coast Guard officer designated by the Commandant to command a Coast Guard District as described in part 3 of this chapter.

(845) "ETA" means estimated time of arrival.

(846) "Length of Tow" means, when towing with a hawser, the length in feet from the stern of the towing vessel to the stern of the last vessel in tow. When pushing ahead or towing alongside, length of tow means the tandem length in feet of the vessels in tow excluding the length of the towing vessel.

(847) "Person" means an individual, firm, corporation, association, partnership, or governmental entity.

(848) "State" means each of the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Trust Territories of the Pacific Islands, the Commonwealth of the Northern Marianas Islands, and any other commonwealth, territory, or possession of the United States.

(849) "Tanker" means a self-propelled tank vessel constructed or adapted primarily to carry oil or hazardous materials in bulk in the cargo spaces.

(850) "Tank Vessel" means a vessel that is constructed or adapted to carry, or that carries, oil or hazardous material in bulk as cargo or cargo residue.

(851) "Vehicle" means every type of conveyance capable of being used as a means transportation on land.

(852) "Vessel" means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water.

(853) "Vessel Traffic Services (VTS)" means a service implemented under Part 161 of this chapter by the United States Coast Guard designed to improve the safety and efficiency of vessel traffic and to protect the environment. The VTS has the capability to interact with marine traffic and respond to traffic situations developing in the VTS area.

(854) "Vessel Traffic Service Area or VTS Area" means the geographical area encompassing a specific VTS area of service as described in Part 161 of this chapter. This area of service may be subdivided into sectors for the purpose of allocating responsibility to individual Vessel Traffic Centers or to identify different operating requirements.

(855) **Note:** Although regulatory jurisdiction is limited to the navigable waters of the United States, certain vessels will be encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate traffic management within the VTS area.

(856) "VTS Special Area" means a waterway within a VTS area in which special operating requirements apply.

(857) **§160.5 Delegations.**

(858) (a) District Commanders and Captains of the Ports are delegated the authority to establish safety zones.

(859) (b) Under the provisions of 33 CFR 6.04-1 and 6.04-6, District Commanders and Captains of the Ports have been delegated authority to establish security zones.

(860) (c) Under the provisions 33 CFR §1.05-1, District Commanders have been delegated authority to establish regulated navigation areas.

(861) (d) Subject to the supervision of the cognizant Captain of the Port and District Commander, Commanding Officers, Vessel Traffic Services are delegated authority under 33 CFR 1.01-30 to discharge the duties of the Captain of the Port that involve directing the operation, movement and anchorage of vessels within a Vessel Traffic Service area including management of vessel traffic within anchorages, regulated navigation areas and safety zones. and to enforce Vessel Traffic Service and ports and waterways safety regulations. This authority may be exercised by Vessel Traffic Center personnel. The Vessel Traffic Center may, within the Vessel Traffic Service area, provide information, make recommendations, or to a vessel required under Part 161 of this chapter to participate in a Vessel Traffic Service, issue an order, including an order to operate or anchor as directed; require the vessel to comply with orders issued; specify times of entry, movement or departure; restrict operations as necessary for safe operation under the circumstances; or take other action necessary for control of the vessel and the safety of the port or of the marine environment.

(862) **§160.7 Appeals.**

(863) (a) Any person directly affected by a safety zone or an order or direction issued under this subchapter (33 CFR Subchapter P) may request reconsideration by the official who issued it or in whose name it was issued. This request may be made orally or

in writing, and the decision of the official receiving the request may be rendered orally or in writing.

(864) (b) Any person directly affected by the establishment of a safety zone or by an order or direction issued by, or on behalf of, a Captain of the Port may appeal to the District Commander through the Captain of the Port. The appeal must be in writing, except as allowed under paragraph (d) of this section, and shall contain complete supporting documentation and evidence which the appellant wishes to have considered. Upon receipt of the appeal, the District Commander may direct a representative to gather and submit documentation or other evidence which would be necessary or helpful to a resolution of the appeal. A copy of this documentation and evidence is made available to the appellant. The appellant is afforded five working days from the date of receipt to submit rebuttal materials. Following submission of all materials, the District Commander issues a ruling, in writing, on the appeal. Prior to issuing the ruling, the District Commander may, as a matter of discretion, allow oral presentation on the issues.

(865) (c) Any person directly affected by the establishment of a safety zone or by an order or direction issued by a District Commander, or who receives an unfavorable ruling on an appeal taken under paragraph (b) of this section, may appeal through the District Commander to the Assistant Commandant for Office of Marine Safety, Security and Environmental Protection, U.S. Coast Guard, Washington, D.C. 20593. The appeal must be in writing, except as allowed under paragraph (d) of this section. The District Commander forwards the appeal, all the documents and evidence which formed the record upon which the order or direction was issued or the ruling under paragraph (b) of this section was made, and any comments which might be relevant, to the Assistant Commandant for Office of Marine Safety, Security and Environmental Protection. A copy of this documentation and evidence is made available to the appellant. The appellant is afforded five working days from the date of receipt to submit rebuttal materials to the Assistant Commandant for Office of Marine Safety, Security and Environmental Protection. The decision of the Assistant Commandant for Office of Marine Safety, Security and Environmental Protection is based upon the materials submitted, without oral argument or presentation. The decision of the Assistant Commandant for Office of Marine Safety, Security and Environmental Protection is issued in writing and constitutes final agency action.

(866) (d) If the delay in presenting a written appeal would have significant adverse impact on the appellant, the appeal under paragraphs (b) and (c) of this section may initially be presented orally. If an initial presentation of the appeal is made orally, the appellant must submit the appeal in writing within five days of the oral presentation to the Coast Guard official to whom the presentation was made. The written appeal must contain, at a minimum, the basis for the appeal and a summary of the material presented orally. If requested, the official to whom the appeal is directed may stay the effect of the action while the ruling is being appealed.

## Subpart B–Control of Vessel and Facility Operations

(867) **§160.101 Purpose.**

(868) This subpart describes the authority exercised by District Commanders and Captains of the Ports to insure the safety of vessels and waterfront facilities, and the protection of the navigable waters and the resources therein. The controls described in this subpart are directed to specific situations and hazards.

(869) **§160.103 Applicability.**

(870) (a) This subpart applies to any–

(871) (1) Vessel on the navigable waters of the United States, except as provided in paragraphs (b) and (c) of this section;

(872) (2) Bridge or other structure on or in the navigable waters of the United States; and

(873) (3) Land structure or shore area immediately adjacent to the navigable waters of the United States.

(874) (b) This subpart does not apply to any vessel on the Saint Lawrence Seaway.

(875) (c) Except pursuant to international treaty, convention, or agreement, to which the United States is a party, this subpart does not apply to any foreign vessel that is not destined for, or departing from, a port or place subject to the jurisdiction of the United States and that is in–

(876) (1) Innocent passage through the territorial sea of the United States;

(877) (2) Transit through the navigable waters of the United States which form a part of an international strait.

(878) **§160.105 Compliance with orders.**

(879) Each person who has notice of the terms of an order issued under this subpart must comply with that order.

(880) **§160.107 Denial of entry.**

(881) Each District Commander or Captain of the Port, subject to recognized principles of international law, may deny entry into the navigable waters of the United States or to any port or place under the jurisdiction of the United States, and within the district or zone of that District Commander or Captain of the Port, to any vessel not in compliance with the provisions of the Port and Tanker Safety Act (33 U.S.C. 1221-1232) or the regulations issued thereunder.

(882) **§160.109 Waterfront facility safety.**

(883) (a) To prevent damage to, or destruction of, any bridge or other structure on or in the the navigable waters of the United States, or any land structure or shore area immediately adjacent to those waters, and to protect the navigable waters and the resources therein from harm resulting from vessel or structure damage, destruction, or loss, each District Commander or Captain of the Port may–

(884) (1) Direct the handling, loading, unloading, storage, stowage, and movement (including the emergency removal, control, and disposition) of explosives or other dangerous articles and substances, including oil or hazardous material as those terms are defined in 46 U.S.C. 2101 on any structure on or in the navigable waters of the United States, or any land structure or shore area immediately adjacent to those waters; and

(885) (2) Conduct examinations to assure compliance with the safety equipment requirements for structures.

(886) **§160.111 Special orders applying to vessel operations.**

(887) Each District Commander or Captain of the Port may order a vessel to operate or anchor in the manner directed when–

(888) (a) The District Commander or Captain of the Port has reasonable cause to believe that the vessel is not in compliance with any regulation, law or treaty;

(889) (b) The District Commander or Captain of the Port determines that the vessel does not satisfy the conditions for vessel operation and cargo transfers specified in §160.113; or

(890) (c) The District Commander or Captain of the Port has determined that such order is justified in the interest of safety by reason of weather, visibility, sea conditions, temporary port congestion, other temporary hazardous circumstances, or the condition of the vessel.

(891) **§160.113 Prohibition of vessel operation and cargo transfers.**

(892) (a) Each District Commander or Captain of the Port may prohibit any vessel, subject to the provisions of chapter 37 of Title 46, U.S. Code from operating in the navigable waters of the

United States, or from transferring cargo or residue in any port or place under the jurisdiction of the United States, and within the district or zone of that District Commander or Captain of the Port, if the District Commander or the Captain of the Port determines that the vessel's history of accidents, pollution incidents, or serious repair problems creates reason to believe that the vessel may be unsafe or pose a threat to the marine environment.

(893) (b) The authority to issue orders prohibiting operation of the vessels or transfer of cargo or residue under paragraph (a) of this section also applies if the vessel:

(894) (1) Fails to comply with any applicable regulation;

(895) (2) Discharges oil or hazardous material in violation of any law or treaty of the United States;

(896) (3) Does not comply with applicable vessel traffic service requirements;

(897) (4) While underway, does not have at least one licensed deck officer on the navigation bridge who is capable of communicating in the English language.

(898) (c) When a vessel has been prohibited from operating in the navigable waters of the United States under paragraphs (a) or (b) of this section, the District Commander or Captain of the Port may allow provisional entry into the navigable waters of the United States, or into any port or place under the jurisdiction of the United States and within the district or zone of that District Commander or Captain of the Port, if the owner or operator of such vessel proves to the satisfaction of the District Commander or Captain of the Port, that the vessel is not unsafe or does not pose a threat to the marine environment, and that such entry is necessary for the safety of the vessel or the persons on board.

(899) (d) A vessel which has been prohibited from operating in the navigable waters of the United States, or from transferring cargo or residue in a port or place under the jurisdiction of the United States under the provisions of paragraph (a) or (b)(1), (2) or (3) of this section, may be allowed provisional entry if the owner or operator proves, to the satisfaction of the District Commander or Captain of the Port that has jurisdiction, that the vessel is no longer unsafe or a threat to the environment, and that the condition which gave rise to the prohibition no longer exists.

(900) **§160.115 Withholding of clearance.**

(901) (a) Each District Commander or Captain of the Port may request the Secretary of the Treasury, or the authorized representative thereof, to withhold or revoke the clearance required by 46 U.S.C. App. 91 of any vessel, the owner or operator of which is subject to any penalties under 33 U.S.C. 1232.

**Subpart C–Notifications of Arrivals, Departures, Hazardous Conditions, and Certain Dangerous Cargoes**

(902) **§160.201 Applicability and exceptions to applicability.**

(903) (a) This subpart prescribes notification requirements for U.S. and foreign vessels bound for or departing from ports or places in the United States.

(904) (b) This part does not apply to recreational vessels under 46 U.S.C. 4301 et seq. and, except §160.215, does not apply to:

(905) (1) Passenger and supply vessels when they are employed in the exploration for or in the removal of oil, gas, or mineral resources on the continental shelf, and

(906) (2) Oil Spill Recovery Vessels (OSRVs) when engaged in actual spill response operations or during spill response exercises.

(907) (c) Section 160.207 does not apply to the following:

(908) (1) Each vessel of 300 gross tons or less, except a foreign vessel of 300 gross tons or less entering any port or place in the Seventh Coast Guard District as described by 3.35-1(b) of this chapter.

(909) (2) Each vessel operating exclusively within a Captain of the Port zone.

(910) (3) Each vessel operating upon a route that is described in a schedule that is submitted to the Captain of the Port for each port or place of destination listed in the schedule at least 24 hours in advance of the first date and time of arrival listed on the schedule and contains–

(911) (i) Name of the vessel;

(912) (ii) Country of registry of the vessel;

(913) (iii) Call sign of the vessel;

(914) (iv) International Maritime Organization (IMO) international number or, if the vessel does not have an assigned IMO international number, the official number of the vessel;

(915) (v) Name of the registered owner of the vessel;

(916) (vi) Name of the operator of the vessel:

(917) (vii) Name of the classification society of the vessel;

(918) (viii) Each port or place of destinations;

(919) (ix) Estimated dates and times of arrivals at and departures from these ports or places; and

(920) (x) Name and telephone number of a 24-hour point of contact.

(921) (4) Each vessel arriving at a port or place under force majeure.

(922) (5) Each vessel entering a port of call in the United States in compliance with the Automated Mutual Assistance Vessel Rescue System (AMVER).

(923) (6) Each vessel entering a port of call in the United States in compliance with the U.S. Flag Merchant Vessel Locator Filing System (USMER).

(924) (7) Each barge.

(925) (8) Each public vessel.

(926) (9) United States or Canadian flag vessels, except tank vessels or vessels carrying certain dangerous cargo, which operate solely on the Great lakes.

(927) (d) Sections 160.207, 160.211, and 160.213 apply to each vessel upon the waters of the Mississippi River between its mouth and mile 235, Lower Mississippi River, above Head of Passes, Sections 160.207, 160.211, and 160.213 do not apply to each vessel upon the waters of the Mississippi River between its sources and mile 235, above Head of Passes, and all the tributaries emptying there into and their tributaries, and that part of the Atchafalaya River above its junction with the Plaquemine-Morgan City alternate waterway, and the Red River of the North.

(928) **§160.203 Definitions.**

(929) As used in this subpart:

(930) "Agent" means any person, partnership, firm, company or corporation engaged by the owner or charterer of a vessel to act in their behalf in matters concerning the vessel.

(931) "Carried in bulk" means a commodity that is loaded or carried on board a vessel without containers or labels and received and handled without mark or count.

(932) "Certain dangerous cargo" includes any of the following:

(933) (a) Class A explosives, as defined in 46 CFR 146.20–7 and 49 CFR 173.53.

(934) (b) Oxidizing materials or blasting agents for which a permit is required under 49 CFR 176.415.

(935) (c) Highway route controlled quantity radioactive material, as defined in 49 CFR 173.403(1), or Fissile Class III shipments of fissile radioactive material, as defined in 49 CFR 173.455(a)(3).

(936) (d) Each cargo under Table 1 of 46 CFR Part 153 when carried in bulk.

(937) (e) Any of the following when carried in bulk:

(938) Acetaldehyde
(939) Ammonia, anhydrous
(940) Butadiene
(941) Butane
(942) Butene
(943) Butylene Oxide
(944) Chlorine
(945) Ethane
(946) Ethylene
(947) Ethylene Oxide
(948) Methane
(949) Methyl Acetylene, Propadiene Mixture, Stabilized
(950) Methyl Bromide
(951) Methyl Chloride
(952) Phosphorous, elemental
(953) Propane
(954) Propylene
(955) Sulfur Dioxide
(956) Vinyl Chloride.

(957) "Great Lakes" means Lakes Superior, Michigan, Huron, Erie, and Ontario, their connecting and tributary waters, the Saint Lawrence River as far east as Saint Regis, and adjacent port areas.

(958) "Gross tons" means the tonnage determined by the tonnage authorities of a vessel's flag state in accordance with the national tonnage rules in force before the entry into force of the International Convention on Tonnage Measurement of Ships, 1969 ("Convention"). For a vessel measured only under Annex I of the Convention, gross tons means that tonnage. For a vessel measured under both systems, the higher gross tonnage is the tonnage used for the purposes of the 300-gross-ton threshold.

(959) "Hazardous condition" means any condition that could adversely affect the safety of any vessel, bridge, structure, or shore area or the environmental quality of any port, harbor, or navigable water of the United States. This condition could include but is not limited to, fire, explosion, grounding, leakage, damage, illness of a person on board, or a manning shortage.

(960) "Operator" means any person including, but not limited to, an owner, a demise– (bareboat–) charterer, or another contractor who conducts, or is responsible for, the operation of a vessel.

(961) "Port or place of departure" means any port or place in which a vessel is anchored or moored.

(962) "Port or place of destination" means any port or place to which a vessel is bound to anchor or moor.

(963) "Public vessel" means a vessel that is owned or demise–(bareboat–) chartered by the government of the United States, by a State or local government, or by the government of a foreign country and that is not engaged in commercial service.

(964) **§160.205 Waivers.**

(965) The Captain of the Port may waive, within that Captain of the Port's designated zone, any of the requirements of this subpart for any vessel or class of vessels upon finding that the vessel, route, area of operations, conditions of the voyage, or other circumstances are such that application of this subpart is unnecessary or impractical for purposes of safety, environmental protection, or national security.

(966) **§160.207 Notice of arrival: vessels bound for ports or places in the United States.**

(967) (a) The owner, master, agent or person in charge of a vessel on a voyage of 24 hours or more shall report under paragraph (c) of this section at least 24 hours before entering the port or place of destination.

(968) (b) The owner, master, agent, or person in charge of a vessel on a voyage of less than 24 hours shall report under paragraph (c) of this section before departing the port or place of departure.

(969) (c) The Captain of the Port of the port or place of destination in the United States must be notified of–

(970) (1) Name of the vessel;

(971) (2) Country of registry of the vessel;

(972) (3) Call sign of the vessel;

(973) (4) International Maritime Organization (IMO) international number or, if the vessel does not have an assigned IMO international number, the official number of the vessel;

(974) (5) Name of the registered owner of the vessel;

(975) (6) Name of the operator of the vessel;

(976) (7) Name of the classification society of the vessel;

(977) (8) Name of the port or place of departure;

(978) (9) Name of the port or place of destination;

(979) (10) Estimated date and time of arrival at this port or place; and

(980) (11) Name and telephone number of a 24–hour point of contact.

(981) (d) International Safety Management (ISM) Code (Chapter IX of SOLAS) Notice. If you are the owner, agent, master, operator, or person in charge of a vessel that is 500 gross tons or more and engaged on a foreign voyage to the United States, you must provide the ISM Code notice described in paragraph (e) as follows:

(982) (1) ISM Code notice beginning January 26, 1998, if your vessel is—a passenger vessel carrying more than 12 passengers, a tank vessel, a bulk freight vessel, or a high-speed freight vessel.

(983) (2) ISM Code notice beginning January 1, 2002, if your vessel is—a freight vessel not listed in paragraph (d)(1) or a self-propelled mobile offshore drilling unit (MODU).

(984) (e) Content and Manner of ISM Code Notice.

(985) (1) ISM Code notice includes the following:

(986) (i) The date of issuance for the company's Document of Compliance certificate that covers the vessel.

(987) (ii) The date of issuance for the vessel's Safety Management Certificate, and,

(988) (iii) The name of the Flag Administration, or the recognized organization(s) representing the vessel flag administration, that issued those certificates.

(989) (2) If you meet the criteria in paragraph (d) of this section, you must give the ISM Code notice to the Coast Guard Captain of the Port of the port or place of your destination in the U.S. at least 24 hours before you enter the port or place of destination. The ISM Code notice may be combined and provided with the report required by paragraph (a) of this section.

(990) If the estimated time of arrival changes by more than six hours from the latest reported time, the Captain of the Port must be notified of the correction as soon as the change is known.

(991) **§160.209 (Reserved)**

(992) **§160.211 Notice of arrival: Vessels carrying certain dangerous cargo.**

(993) (a) The owner, agent, master, operator, or person in charge of a vessel, except a barge, bound for a port or place in the United States and carrying certain dangerous cargo, shall notify the Captain of the Port of the port or place of destination at least 24 hours before entering that port or place of the:

(994) (1) Name of the vessel;

(995) (2) Country of registry of the vessel;

(996) (3) Call sign of the vessel;

(997) (4) International Maritime Organization (IMO) international number or, if the vessel does not have an assigned IMO international number, the official number of the vessel;

(998) (5) Name of the registered owner of the vessel;

(999) (6) Name of the operator of the vessel;

(1000) (7) Name of the classification society of the vessel;

(1001) (8) Name of the port or place of departure;

(1002) (9) Name of the port or place of destination;

(1003) (10) Estimated date and time of arrival at this port or place;

(1004) (11) Name of telephone number of a 24–hour point of contact;

(1005) (12) Location of the vessel at the time of the report;

(1006) (13) Name of each of the certain dangerous cargoes carried;

(1007) (14) Amount of each of the certain dangerous cargoes carried;

(1008) (15) Stowage location of each of the certain dangerous cargoes carried; and

(1009) (16) Operational condition of the equipment under §164.35 of this chapter.

(1010) (b) The owner, agent, master, operator, or person in charge of a barge bound for a port or place in the United States carrying a certain dangerous cargo shall report the information required in paragraph (a)(1) through (a)(4) and (a)(8) through (a)(15) of this section to the Captain of the Port of the port or place of destination at least 4 hours before entering that port or place.

(1011) **§160.213 Notice of departure: Vessels carrying certain dangerous cargo.**

(1012) (a) The owner, agent, master, operator, or person in charge of a vessel, except a barge, departing from a port or place in the United States for any other port or place and carrying certain dangerous cargo, shall notify the Captain of the Port or place of departure at least 24 hours before departing, unless this notification was made within 2 hours after the vessel's arrival of the:

(1013) (1) Name of the vessel:

(1014) (2) Country of registry of the vessel;

(1015) (3) Call sign of the vessel;

(1016) (4) International Maritime Organization (IMO) international number or, if the vessel does not have an assigned IMO international number, the official number of the vessel;

(1017) (5) Name of the registered owner of the vessel;

(1018) (6) The name of the port or place of departure; and

(1019) (7) Name of the classification society of the vessel;

(1020) (8) Name of the port or place of departure;

(1021) (9) Name of the port or place of destination;

(1022) (10) Estimated date and time of arrival of this port or place;

(1023) (11) Name and telephone number of a 24-hour point of contact;

(1024) (12) Name of each of the certain dangerous cargoes carried;

(1025) (13) Amount of each of the certain dangerous cargoes carried;

(1026) (14) Stowage location of each of the certain dangerous cargoes carried; and

(1027) (15) Operational condition of the equipment under §164.35 of this chapter.

(1028) If the estimated time of departure changes by more than six hours from the latest reported time, the Captain of the Port must be notified of the correction as soon as the change is known.

(1029) (b) The owner, agent, master, operator, or person in charge of a barge departing from a port or place in the United States for any other port or place and carrying a certain dangerous cargo shall report the information required in paragraph (a)(1) through (a)(4) and (a)(8) through (a)(15) of this section to the Captain of the Port of the port or place of departure at least 4 hours before departing unless this report was made within 2 hours after the barge's arrival.

(1030) **§160.215 Notice of hazardous conditions.**

(1031) Whenever there is a hazardous condition on board a vessel, the owner, master, agent, or person in charge shall immediately notify the Captain of the Port of the port or place of destination and the Captain of the Port of the port or place in which the vessel is located of the hazardous condition.

## Part 161–Vessel Traffic Management

### Subpart A–Vessel Traffic Services

(1032) **GENERAL RULES**

(1033) **§161.1 Purpose and Intent.**

(1034) (a) The purpose of this part is to promulgate regulations implementing and enforcing certain sections of the Ports and Waterways Safety Act (PWSA) setting up a national system of Vessel Traffic Services that will enhance navigation, vessel safety, and marine environmental protection and promote safe vessel movement by reducing the potential for collisions, rammings, and groundings, and the loss of lives and property associated with these incidents within VTS areas established hereunder.

(1035) (b) Vessel Traffic Services provide the mariner with information related to the safe navigation of a waterway. This information, coupled with the mariner's compliance with the provisions set forth in this part, enhances the safe routing of vessels through congested waterways or waterways of particular hazard. Under certain circumstances, a VTS may issue directions to control the movement of vessels in order to minimize the risk of collision between vessels, or damage to property or the environment.

(1036) (c) The owner, operator, charterer, master, or person directing the movement of a vessel remains at all times responsible for the manner in which the vessel is operated and maneuvered, and is responsible for the safe navigation of the vessel under all circumstances. Compliance with these rules or with a direction of the VTS is at all times contingent upon the exigencies of safe navigation.

(1037) (d) Nothing in this part is intended to relieve any vessel owner, operator, charterer, master, or person directing the movement of a vessel from the consequences of any neglect to comply with this part or any other applicable law or regulations (e.g., the International Regulations for Prevention of Collisions at Sea, 1972 (72 COLREGS) or the Inland Navigation Rules) or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

(1038) **§161.2 Definitions.**

(1039) For the purposes of this part:

(1040) "Cooperative Vessel Traffic Services (CVTS)" means the system of vessel traffic management established and jointly operated by the United States and Canada within adjoining waters. In addition, CVTS facilitates traffic movement and anchorages, avoids jurisdictional disputes, and renders assistance in emergencies in adjoining United States and Canadian waters.

(1041) "Hazardous Vessel Operating Condition" means any condition related to a vessel's ability to safely navigate or maneuver, and includes, but is not limited to:

(1042) (1) The absence or malfunction of vessel operating equipment, such as propulsion machinery, steering gear, radar system, gyrocompass, depth sounding device, automatic radar plotting aid

(ARPA), radiotelephone, Automatic Identification System Shipborne equipment, navigational lighting, sound signaling devices or similar equipment.

(1043) (2) Any condition on board the vessel likely to impair navigation, such as lack of current nautical charts and publications, personnel shortage, or similar condition.

(1044) (3) Vessel characteristics that affect or restrict maneuverability, such as cargo arrangement, trim, loaded condition, underkeel clearance, speed, or similar characteristics.

(1045) "Precautionary Area" means a routing measure comprising an area within defined limits where vessels must navigate with particular caution and within which the direction of traffic may be recommended.

(1046) "Towing Vessel" means any commercial vessel engaged in towing another vessel astern, alongside, or by pushing ahead.

(1047) "Vessel Movement Reporting System (VMRS)" is a system used to manage and track vessel movements within a VTS area. This is accomplished by a vessel providing information under established procedures as set forth in this part, or as directed by the VTS.

(1048) "Vessel Movement Reporting System (VMRS) User" means a vessel, or an owner, operator, charterer, master, or person directing the movement of a vessel, that is required to participate in a VMRS within a VTS area. VMRS participation is required for:

(1049) (1) Every power-driven vessel of 40 meters (approximately 131 feet) or more in length, while navigating;

(1050) (2) Every towing vessel of 8 meters (approximately 26 feet) or more in length, while navigating; or

(1051) (3) Every vessel certificated to carry 50 or more passengers for hire, when engaged in trade.

(1052) "Vessel Traffic Center (VTC)" means the shore-based facility that operates the vessel traffic service for the Vessel Traffic Service area or sector within such an area.

(1053) "Vessel Traffic Services (VTS)" means a service implemented by the United States Coast Guard designed to improve the safety and efficiency of vessel traffic and to protect the environment. The VTS has the capability to interact with marine traffic and respond to traffic situations developing in the VTS area.

(1054) "Vessel Traffic Service Area or VTS Area" means the geographical area encompassing a specific VTS area of service. This area of service may be subdivided into sectors for the purpose of allocating responsibility to individual Vessel Traffic Centers or to identify different operating requirements.

(1055) **Note:** Although regulatory jurisdiction is limited to the navigable waters of the United States, certain vessels will be encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate traffic management within the VTS area.

(1056) "VTS Special Area" means a waterway within a VTS area in which special operating requirements apply.

(1057) "VTS User" means a vessel, or an owner, operator, charterer, master, or person directing the movement of a vessel, that is:

(1058) (a) Subject to the Vessel Bridge-to-Bridge Radiotelephone Act; or

(1059) (b) Required to participate in a VMRS within a VTS area (VMRS User).

(1060) "VTS User's Manual" means the manual established and distributed by the VTS to provide the mariner with a description of the services offered and rules in force for that VTS. Additionally, the manual may include chartlets showing the area and sector boundaries, general navigational information about the area, and procedures, radio frequencies, reporting provisions and other information which may assist the mariner while in the VTS area.

(1061) **§161.3 Applicability.**

(1062) The provisions of this subpart shall apply to each VTS User and may also apply to any vessel while underway or at anchor on the navigable waters of the United States within a VTS area, to the extent the VTS considers necessary.

(1063) **§161.4 Requirement to carry the rules.**

(1064) Each VTS User shall carry on board and maintain for ready reference a copy of these rules.

(1065) **Note:** These rules are contained in the applicable U.S. Coast Pilot, the VTS User's Manual which may be obtained by contacting the appropriate VTS, and periodically published in the Local Notice to Mariners. The VTS User's Manual and the World VTS Guide, an International Maritime Organization (IMO) recognized publication, contain additional information which may assist the prudent mariner while in the appropriate VTS area.

(1066) **§161.5 Deviations from the rules.**

(1067) (a) Requests to deviate from any provision in this part, either for an extended period of time or if anticipated before the start of a transit, must be submitted in writing to the appropriate District Commander. Upon receipt of the written request, the District Commander may authorize a deviation if it is determined that such a deviation provides a level of safety equivalent to that provided by the required measure or is a maneuver considered necessary for safe navigation under the circumstances. An application for an authorized deviation must state the need and fully describe the proposed alternative to the required measure.

(1068) (b) Requests to deviate from any provision in this part due to circumstances that develop during a transit or immediately preceding a transit, may be made verbally to the appropriate VTS Commanding Officer. Requests to deviate shall be made as far in advance as practicable. Upon receipt of the request, the VTS Commanding Officer may authorize a deviation if it is determined that, based on vessel handling characteristics, traffic density, radar contacts, environmental conditions and other relevant information, such a deviation provides a level of safety equivalent to that provided by the required measure or is a maneuver considered necessary for safe navigation under the circumstances.

(1069) **Services, VTS Measures, and Operating Requirements**

(1070) **§161.10 Services.**

(1071) To enhance navigation and vessel safety, and to protect the marine environment, a VTS may issue advisories, or respond to vessel requests for information, on reported conditions within the VTS area, such as:

(1072) (a) Hazardous conditions or circumstances;

(1073) (b) Vessel congestion;

(1074) (c) Traffic density;

(1075) (d) Environmental conditions;

(1076) (e) Aids to navigation status;

(1077) (f) Anticipated vessel encounters;

(1078) (g) Another vessel's name, type, position, hazardous vessel operating conditions, if applicable, and intended navigation movements, as reported;

(1079) (h) Temporary measures in effect;

(1080) (i) A description of local harbor operations and conditions, such as ferry routes, dredging, and so forth;

(1081) (j) Anchorage availability; or

(1082) (k) Other information or special circumstances.

(1083) **§161.11 VTS measures.**

(1084) (a) A VTS may issue measures or directions to enhance navigation and vessel safety and to protect the marine environment, such as, but not limited to:

(1085) (1) Designating temporary reporting points and procedures;

(1086) (2) Imposing vessel operating requirements; or

(1087) (3) Establishing vessel traffic routing schemes.

(1088) (b) During conditions of vessel congestion, restricted visibility, adverse weather, or other hazardous circumstances, a VTS may control, supervise, or otherwise manage traffic, by specifying times of entry, movement, or departure to, from, or within a VTS area.

(1089) **§161.12 Vessel operating requirements.**

(1090) (a) Subject to the exigencies of safe navigation, a VTS User shall comply with all measures established or directions issued by a VTS.

(1091) (1) If, in a specific circumstance, a VTS User is unable to safely comply with a measure or direction issued by the VTS, the VTS User may deviate only to the extent necessary to avoid endangering persons, property or the environment. The deviation shall be reported to the VTS as soon as is practicable.

(1092) (b) When not exchanging communications, a VTS User must maintain a listening watch as required by §26.04(e) of this chapter on the VTS frequency designated in Table 161.12(b) (VTS Call Signs, Designated Frequencies, and Monitoring Areas). In addition, the VTS User must respond promptly when hailed and communicate in the English language.

(1093) **Note:** As stated in 47 CFR 80.148(b), a VHF watch on Channel 16 (156.800 MHz) is not required on vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act and participating in a Vessel Traffic Service (VTS) system when the watch is maintained on both the vessel bridge-to-bridge frequency and a designated VTS frequency.

(1094) (c) As soon is practicable, a VTS User shall notify the VTS of any of the following:

(1095) (1) A marine casualty as defined in 46 CFR 4.05-1;

(1096) (2) Involvement in the ramming of a fixed or floating object;

(1097) (3) A pollution incident as defined in §151.15 of this chapter:

(1098) (4) A defect or discrepancy in an aid to navigation;

(1099) (5) A hazardous condition as defined in §160.203 of this chapter;

(1100) (6) Improper operation of vessel equipment required by Part 164 of this chapter;

(1101) (7) A situation involving hazardous materials for which a report is required by 49 CFR 176.48; and

(1102) (8) A hazardous vessel operating condition as defined in §161.2.

(1103) **§161.13 VTS Special Area Operating Requirements.**

(1104) The following operating requirements apply within a VTS Special Area:

(1105) (a) A VTS User shall, if towing astern, do so with as short a hawser as safety and good seamanship permits.

(1106) (b) A VMRS User shall:

(1107) (1) Not enter or get underway in the area without prior approval of the VTS;

(1108) (2) Not enter a VTS Special Area if a hazardous vessel operating condition or circumstance exists;

(1109) (3) Not meet, cross, or overtake any other VMRS User in the area without prior approval of the VTS; and

(1110) (4) Before meeting, crossing, or overtaking any other VMRS User in the area, communicate on the designated vessel bridge-to-bridge radiotelephone frequency, intended navigation movements, and any other information necessary in order to make safe passing arrangements. This requirement does not relieve a vessel of any duty prescribed by the International Regulations for Prevention of Collisions at Sea, 1972 (72 COLREGS) or the Inland Navigation Rules.

**Subpart B–Vessel Movement Reporting System**

(1111) **§161.15 Purpose and Intent.**

(1112) (a) A Vessel Movement Reporting System (VMRS) is a system used to manage and track vessel movements within a VTS area. This is accomplished by requiring that vessels provide information under established procedures as set forth in this part, or as directed by the VTS.

(1113) (b) To avoid imposing an undue reporting burden or unduly congesting radiotelephone frequencies, reports shall be limited to information which is essential to achieve the objectives of the VMRS. These reports are consolidated into four reports (sailing plan, position, sailing plan deviation and final).

(1114) **§161.16 Applicability.**

(1115) The provisions of this subpart shall apply to the following VMRS Users:

(1116) (a) Every power-driven vessel of 40 meters (approximately 131 feet) or more in length, while navigating;

(1117) (b) Every towing vessel of 8 meters (approximately 26 feet) or more in length, while navigating; or

(1118) (c) Every vessel certificated to carry 50 or more passengers for hire, when engaged in trade.

(1119) **§161.17 Definitions.**

(1120) As used in this subpart: Published means available in a widely-distributed and publicly available medium (e.g., VTS User's Manual, ferry schedule, Notice to Mariners).

(1121) **§161.18 Reporting requirements.**

(1122) (a) A VTS may: (1) Direct a vessel to provide any of the information set forth in Table 161.18(a) (IMO Standard Ship Reporting System);

(1123) (2) Establish other means of reporting for those vessels unable to report on the designated frequency; or

(1124) (3) Require reports from a vessel in sufficient time to allow advance vessel traffic planning.

(1125) (b) All reports required by this part shall be made as soon as is practicable on the frequency designated in Table 161.12(b) (VTS Call Signs, Designated Frequencies, and Monitoring Areas).

(1126) (c) When not exchanging communications, a VMRS User must maintain a listening watch as described in §26.04(e) of this chapter on the frequency designated in Table 161.12(b) (VTS Call Signs, Designated Frequencies, and Monitoring Areas). In addition, the VMRS User must respond promptly when hailed and communicate in the English language.

(1127) **Note:** As stated in 47 CFR 80.148(b), a VHF watch on Channel 16 (156.800 MHz) is not required on vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act and participating in a Vessel Traffic Service (VTS) system when the watch is maintained on both the vessel bridge-to-bridge frequency and a designated VTS frequency.

(1128) (d) When reports required by this part include time information, such information shall be given using the local time zone in effect and the 24-hour military clock system.

(1129) **§161.19 Sailing Plan (SP).**

(1130) Unless otherwise stated, at least 15 minutes before navigating a VTS area, a vessel must report the:

(1131) (a) Vessel name and type;

# Table161.12(b)—VESSEL TRAFFIC SERVICES (VTS) CALL SIGNS, DESIGNATED FREQUENCIES, AND MONITORING AREAS

| Vessel traffic services (call sign) | Designated frequency[1] (channel designation) | Monitoring area |
|---|---|---|
| | | **New York[2]** |
| New York Traffic[3] . . . . . | 156.550 MHz (Ch. 11) and 156.700 MHz (Ch. 14) . . . . . | The navigable waters of the Lower New York Harbor bounded on the east by a line drawn from Norton Point to Breezy Point; on the south by a line connecting the entrance buoys at the Ambrose Channel, Swash Channel and Sandy Hook Channel to Sandy Hook Point; and on the southeast including the waters of the Sandy Hook Bay south to a line drawn at 40°25′N.; then west into waters of the Raritan Bay to the Raritan River Rail Road Bridge; and then north including the waters of the Arthur Kill and Newark Bay to the Lehigh Valley Draw Bridge at 40°41.95′N.; and then east including the waters of the Kill Van Kull and Upper New York Bay north to a line drawn east-west from the Holland Tunnel Ventilator Shaft at 40°43.7′N., 74°01.6′W. in the Hudson River; and continuing east including the waters of the East River to the Throgs Neck Bridge, excluding the Harlem River. |
| | 156.600 MHz (Ch. 12) . . . . . | Each vessel at anchor within the above areas. |
| | | **Houston[2]** |
| Houston Traffic . . . . . | 156.550 MHz (Ch. 11) . . . . . | The navigable waters north of 29°N., west of 94°20′W., south of 29°49′N., and east of 95°20′W.: The navigable waters north of a line extending due west from the southernmost end of Exxon Dock #1 (29°43.37′N., 95°01.27′W.) |
| | 156.600 MHz (Ch 12). . . . . | The navigable waters south of a line extending due west from the southernmost end of Exxon Dock #1 (29°43.37′N., 95°01.27′W.). |
| | | **Berwick Bay** |
| Berwick Traffic . . . . . | 156.550 MHz (Ch. 11) . . . . . | The navigable waters south of 29°45′N., west of 91°10′W., north of 29°37′N., and east of 91°18′W. |
| | | **St. Marys River** |
| Soo Control . . . . . | 156.600 MHz (Ch. 12) . . . . . | The navigable waters of the St. Marys River between 45°57′N. (De Tour Reef Light) and 46°38.7′N. (Ile Parisienne Light), except the St. Marys Falls Canal and those navigable waters east of a line from 46°04.16′N. and 46°01.57′N. (La Pointe to Sims Point in Potagannissing Bay and Worsley Bay). |
| | | **San Francisco[2]** |
| San Francisco Offshore Vessel Movement. | 156.600 MHz (Ch. 12) . . . . . | The waters within a 38 nautical mile radius of Mount Tamalpais (37°55.8′N., 122°34.6′W.) excluding the San Francisco Offshore Precautionary Area. |
| Reporting Service San Francisco Traffic. | 156.700 MHz (Ch. 14) . . . . . | The waters of the San Francisco Offshore Precautionary Area eastward to San Francisco Bay including its tributaries extending to the ports of Stockton, Sacramento and Redwood City. |

| Vessel traffic services (call sign) | Designated frequency[1] (channel designation) | Monitoring area |
|---|---|---|
| | **Puget Sound[4]** | |
| Seattle Traffic[5] | 156.700 MHz (Ch. 14) | The navigable waters of Puget Sound, Hood Canal and adjacent waters south of a line connecting Marrowstone Point and Lagoon Point in Admiralty Inlet and south of a line drawn due east from the southernmost tip of Possession Point on Whidbey Island to the shoreline. |
| | 156.250 MHz (Ch. 5A) | The navigable waters of the Strait of Juan de Fuca east of 124°40′W. excluding the waters in the central portion of the Strait of Juan de Fuca north and east of Race Rocks; the navigable waters of the Strait of Georgia east of 122°52′W.; the San Juan Island Archipelago, Rosario Strait, Bellingham Bay; Admiralty Inlet north of a line connecting Marrowstone Point and Lagoon Point and all waters east of Whidbey Island north of a line drawn due east from the southernmost tip of Possession Point on Whidbey Island to the shoreline. |
| Tofino Traffic[6] | 156.725 MHz (Ch. 74) | The waters west of 124°40′W. within 50 nautical miles of the coast of Vancouver Island including the waters north of 48°N., and east of 127°W. |
| Vancouver Traffic | 156.550 MHz (Ch. 11) | The navigable waters of the Strait of Georgia west of 122°52′W., the navigable waters of the central Strait of Juan de Fuca north and east of Race Rocks, including the Gulf Island Archipelago, Boundary Pass and Haro Strait. |
| | **Prince William Sound[7]** | |
| Valdez Traffic | 156.650 MHz (Ch. 13) | The navigable waters south of 61°05′N., east of 147°20′W., north of 60°N., and west of 146°30′W.; and, all navigable waters in Port Valdez. |
| | **Louisville[7]** | |
| Louisville Traffic | 156.650 MHz (Ch. 13) | The navigable waters of the Ohio River between McAlpine Locks (Mile 606) and Twelve Mile Island (Mile 593), only when the McAlpine upper pool gauge is at approximately 13.0 feet or above. |

**NOTES:**

[1] In the event of a communication failure either by the vessel traffic center or the vessel or radio congestion on a designated VTS frequency, communications may be established on an alternate VTS frequency. The bridge-to-bridge navigational frequency, 156.650 MHz (Channel 13), is monitored in each VTS area; and it may be used as an alternate frequency, however, only to the extent that doing so provides a level of safety beyond that provided by other means.

[2] Designated frequency monitoring is required within U.S. navigable waters. In areas which are outside the U.S. navigable waters, designated frequency monitoring is voluntary. However, prospective VTS Users are encouraged to monitor the designated frequency.

[3] VMRS participants shall make their initial report (Sail Plan) to New York Traffic on Channel 11 (156.550 MHz). All other reports, including the Final Report, shall be made on Channel 14 (156.700 MHz). VMRS and other VTS Users shall monitor Channel 14 (156.700 MHz) while transiting the VTS area. New York Traffic may direct a vessel to monitor and report on either primary frequency depending on traffic density, weather conditions, or other safety factors. This does not require a vessel to monitor both primary frequencies.

[4] A Cooperative Vessel Traffic Service was established by the United States and Canada within adjoining waters. The appropriate vessel traffic center administers the rules issued by both nations; however, it will enforce only its own set of rules within its jurisdiction.

[5] Seattle Traffic may direct a vessel to monitor the other primary VTS frequency 156.250 MHz or 156.700 MHz (Channel 5A or 14) depending on traffic density, weather conditions, or other safety factors, rather than strictly adhering to the designated frequency required for each monitoring area as defined above. This does not require a vessel to monitor both primary frequencies.

[6] A portion of Tofino Sector's monitoring area extends beyond the defined CVTS area. Designated frequency monitoring is voluntary in these portions outside of VTS jurisdiction, however, prospective VTS Users are encouraged to monitor the designated frequency.

[7] The bridge-to-bridge navigational frequency, 156.650 MHz (Channel 13), is used in these VTSs because the level of radiotelephone transmissions does not warrant a designated VTS frequency. The listening watch required by §26.05 of this chapter is not limited to the monitoring area.

## TABLE 161.18(a).—THE IMO STANDARD SHIP REPORTING SYSTEM

| | | | |
|---|---|---|---|
| A | ALPHA | Ship | Name, call sign or ship station identity, and flag. |
| B | BRAVO | Dates and time of event | A 6 digit group giving day of month (first two digits), hours and minutes (last four digits). If other than UTC state time zone used. |
| C | CHARLIE | Position | A 4 digit group giving latitude in degrees and minutes suffixed with N (north) or S (south) and a 5 digit group giving longitude in degrees and minutes suffixed with E (east) or W (west); or, |
| D | DELTA | Position | True bearing (first 3 digits) and distance (state distance) in nautical miles from a clearly identified landmark (state landmark). |
| E | ECHO | True course | A 3 digit group. |
| F | FOXTROT | Speed in knots and tenths of knots | A 3 digit group. |
| G | GOLF | Port of Departure | Name of last port of call. |
| H | HOTEL | Date, time and point of entry system. | Entry time expressed as in (B) and into the entry position expressed as in (C) or (D). |
| I | INDIA | Destination and expected time of arrival. | Name of port and date time group expressed as in (B). |
| J | JULIET | Pilot | State whether a deep sea or local pilot is on board. |
| K | KILO | Date, time and point of exit from system. | Exit time expressed as in (B) and exit position expressed as in (C) or (D). |
| L | LIMA | Route information | Intended track. |
| M | MIKE | Radio | State in full names of communications stations/ frequencies guarded. |
| N | NOVEMBER | Time of next report | Date time group expressed as in (B). |
| O | OSCAR | Maximum present static draught in meters. | 4 digit group giving meters and centimeters. |
| P | PAPA | Cargo on board | Cargo and brief details of any dangerous cargoes as well as harmful substances and gases that could endanger persons or the environment. |
| Q | QUEBEC | Defects, damage, deficiencies or limitations. | Brief detail of defects, damage, deficiencies or other limitations. |
| R | ROMEO | Description of pollution or dangerous goods lost. | Brief details of type pollution (oil, chemicals, etc) or dangerous goods lost overboard; position expressed as in (C) or (D). |
| S | SIERRA | Weather conditions | Brief details of weather and sea conditions prevailing. |
| T | TANGO | Ship's representative and/or owner. | Details of name and particulars of ship's representative and/or owner for provision of information. |
| U | UNIFORM | Ship size and type | Details of length, breadth, tonnage, and type, etc., as required. |
| V | VICTOR | Medical personnel | Doctor, physician's assistant, nurse, no medic. |
| W | WHISKEY | Total number of persons on board. | State number. |
| X | XRAY | Miscellaneous | Any other information as appropriate. (i.e., a detailed description of a planned operation, which may include: its duration; effective area; any restrictions to navigation; notification procedures for approaching vessels; in addition, for a towing operation; configuration, length of the tow, available horsepower, etc.; for a dredge or floating plant: configuration of pipeline, mooring configuration, number of assist vessels, etc.) |

(1132) (b) Position;

(1133) (c) Destination and ETA;

(1134) (d) Intended route;

(1135) (e) Time and point of entry; and

(1136) (f) Dangerous cargo on board or in its tow, as defined in §160.203 of this chapter, and other required information as set out in §160.211 and§160.213 of this chapter, if applicable.

(1137) **§161.20 Position Report (PR).**

(1138) A vessel must report its name and position:

(1139) (a) Upon point of entry into a VTS area;

(1140) (b) At designated reporting points as set forth in subpart C; or

(1141) (c) When directed by the VTC.

(1142) **Note:** Notice of temporary reporting points, if established, may be published via Local Notices to Mariners, general broadcast or the VTS User's Manual.

(1143) **§161.21 Sailing Plan Deviation Report (DR).**

(1144) A vessel must report:

(1145) (a) When its ETA to a destination varies significantly from a previously reported ETA;

(1146) (b) Any intention to deviate from a VTS issued measure or vessel traffic routing system; or

(1147) (c) Any significant deviation from previously reported information.

(1148) **§161.22 Final Report (FR).**

(1149) A vessel must report its name and position:

(1150) (a) On arrival at its destination; or

(1151) (b) When leaving a VTS area.

(1152) **§161.23 Reporting exemptions.**

(1153) (a) Unless otherwise directed, the following vessels are exempted from providing Position and Final Reports due to the nature of their operation:

(1154) (1) Vessels on a published schedule and route;

(1155) (2) Vessels operating within an area of a radius of three nautical miles or less; or

(1156) (3) Vessels escorting another vessel or assisting another vessel in maneuvering procedures.

(1157) (b) A vessel described in paragraph (a) of this section must:

(1158) (1) Provide a Sailing Plan at least 5 minutes but not more than 15 minutes before navigating within the VTS area; and

(1159) (2) If it departs from its promulgated schedule by more than 15 minutes or changes its limited operating area, make the established VMRS reports, or report as directed.

(1160) (c) In those VTS areas capable of receiving automated position reports from Automatic Identification System Shipborne Equipment (AISSE) as required by §164.43 of this chapter and where AISSE is required, vessels equipped with an operating AISSE are not required to make voice radio position reports at designated reporting points as required by §161.20(b) of this part, unless otherwise directed by the VTC.

(1161) (1) Whenever an AISSE becomes non-operational as defined in §164.43(c) of this chapter, before entering or while underway in a VTS area, a vessel must:

(1162) (i) Notify the VTC;

(1163) (ii) Make voice radio position reports at designated reporting points as required by §161.20(b) of this part;

(1164) (iii) Make other voice radio reports as directed; and

(1165) (iv) Restore the AISSE to operating condition as soon as possible.

(1166) (2) Whenever an AISSE becomes non-operational due to a loss of position correction information (i.e., the U.S. Coast Guard differential global positioning system (dGPS) cannot provide the required error correction messages) a vessel must:

(1167) (i) Make required voice radio position reports at designated reporting points required by §161.20(b) of this part; and

(1168) (ii) Make other voice radio reports as directed.

(1169) **Note:** Regulations pertaining to AISSE required capabilities are set forth in §164.43 of this chapter.

**Subpart C–Vessel Traffic Service Areas, Cooperative Vessel Traffic Service Area, Vessel Traffic Service Special Areas and Reporting Points.**

(1170) **Note:** All geographic coordinates contained in part 161 (latitude and longitude) are expressed in North American Datum of 1983 (NAD).

(1171) **161.25 Vessel Traffic Service New York Area.**

(1172) The area consists of the navigable waters of the Lower New York Harbor bounded on the east by a line drawn from Norton Point to Breezy Point; on the south by a line connecting the entrance buoys at the Ambrose Channel, Swash Channel, and Sandy Hook Channel to Sandy Hook Point; and on the southeast including the waters of Sandy Hook Bay south to a line drawn at 40°25′N.; then west into waters of the Raritan Bay to the Raritan River Rail Road Bridge; and then north including the waters of the Arthur Kill and Newark Bay to the Lehigh Valley Draw Bridge at 40°41.9′N.; and then east including the waters of the Kill Van Kull and Upper New York Bay north to a line drawn east-west from the Holland Tunnel Ventilator Shaft at 40°43.7′N., 74°01.6′W. in the Hudson River; and then continuing east including the waters of the East River to the Throgs Neck Bridge, excluding the Harlem River.

(1173) **Note:** Although mandatory participation in VTSNY is limited to the area within the navigable waters of the United States, VTSNY will provide services beyond those waters. Prospective users are encouraged to report beyond the area of required participation in order to facilitate advance vessel traffic management in the VTS area and to receive VTSNY advisories and/or assistance.

(1174) **§161.45 Vessel Traffic Service St. Marys River.**

(1175) (a) The VTS area consists of the navigable waters of the St. Marys River and lower Whitefish Bay from 45°57′N. (De Tour Reef Light) to the south, to 46°38.7′N. (Ile Parisienne Light) to the north, except the waters of the St. Marys Falls Canal, and to the east along a line from La Pointe to Sims Point, within Potagannissing Bay and Worsley Bay.

(1176) (b) Reporting Points. (Table 161.45(b))

(1177) **§161.838 Transit of Canadian waters.**

(1178) Vessels which have already reported to Soo Control need not make a final report or an initial report when departing or reentering the VTS Area for a brief transit of Canadian waters.

**Part 162–Inland Waterways Navigation Regulations**

(1179) **§162.1 General.**

(1180) Geographic coordinates expressed in terms of latitude o longitude, or both, are not intended for plotting on maps or chart whose referenced horizontal datum is the North American Datun of 1983 (NAD 83), unless such geographic coordinates ar expressly labeled NAD 83. Geographic coordinates without th NAD 83 reference may be plotted on maps or charts referenced t NAD 83 only after application of the appropriate corrections th are published on the particular map or chart being used.

(1181) **§162.110 Duluth-Superior Harbor, Minnesota an Wisconsin.**

## TABLE 161.45(b)—VTS ST. MARYS RIVER REPORTING POINTS

| Designator | Geographic name | Geographic description | Latitude/ Longitude | Notes |
|---|---|---|---|---|
| 1 | Ile Parisienne | Ile Parisienne Light | 46°37.3′N 84°45.9′W | Downbound Only. |
| 2 | Gros Cap Reef | Gros Cap Reefs Light | 46°30.6′N 84°37.1′W | Upbound Only. |
| 3 | Round Island | Round Island Light 32 | 46°26.9′N 84°31.7′W | |
| 4 | Pointe Louise | Pointe Louise Light | 46°27.8′N 84°28.2′W | |
| 5 | West End of Locks | West Center Pierhead Light | 46°30.2′N 84°22.2′W | Downbound Only. |
| 6 | East End of Locks | East Center Pierhead Light | 46°30.1′N 84°20.3′W | Upbound. |
| 7 | Mission Point | Light 99 | 46°29.2′N 84°18.1′W | |
| 8 | Six Mile Point | Six Mile Point | 46°26.1′N 84°15.4′W | |
| 9 | Ninemile Point | Light 80 | 46°23.5′N 84°14.1′W | |
| 10 | West Neebish Channel | Light 29 | 46°16.9′N 84°12.5′W | Downbound Only. |
| 11 | Munuscong Lake Junction | Lighted Junction Buoy | 46°10.8′N 84°05.6′W | |
| 12 | De Tour Reef | De Tour Reef Light | 46°56.9′N 83°53.7′W | |

(1182) (a) No vessel greater than 100 feet in length may exceed 8 miles per hour in Duluth-Superior Harbor.

(1183) (b) In the Duluth Ship Canal:

(1184) (1) No vessel may meet or overtake another vessel if each vessel is greater than 150 feet in length (including tug and tow combinations).

(1185) (2) An inbound vessel has the right of way over an outbound vessel.

(1186) **§162.115 Keweenaw Waterway, Michigan.**

(1187) (a) No vessel greater than 40 feet in length may exceed 8 miles per hour between Lily Pond and Pilgrim Point.

(1188) (b) No vessel may use either the Portage River harbor of refuge the Lily Pond harbor of refuge longer than 24 hours unless given permission to do so by the Captain of the Port.

(1189) **§162.117 St. Marys River, Sault Ste. Marie, Michigan.**

(1190) (a) The area. The waters of the St. Marys River and lower Whitefish Bay from 45°57′N. (De Tour Reef Light) to the south, to 46°38.7′N. (Ile Parisienne Light) to the north, except the waters of the St. Marys Falls Canal, and to the east along a line from La Pointe to Sims Point, within Potagannissing Bay and Worsley Bay.

(1191) (b) Definitions. As used in this section.

(1192) "Two-way route" means a directional route within defined limits inside which two-way traffic is established, and which is intended to improve safety in waters where navigation is difficult.

(1193) "Two-way traffic" means that traffic flow is permitted in opposing directions, but a vessel may not meet, cross, nor overtake any other vessel in such a manner that it would be abreast of more than one other vessel within the defined limits of a waterway.

(1194) (c) *Anchoring Rules*

(1195) (1) A Vessel must not anchor:

(1196) (i) within the waters between Brush Point and the waterworks intake crib off Big Point southward of the Point Aux Pins range; or

(1197) (i) within 0.2 nautical mile of the intake crib off Big Point.

(1198) (2) In an emergency; vessels may anchor in a dredged channel. Vessels shall anchor as near to the edge of the channel as possible and shall get underway as soon as the emergency ceases, unless otherwise directed. Vessel Traffic Services St. Marys River must be advised of any emergency anchoring as soon as is practicable.

(1199) (3) Vessels collected in any part of the VTS Area by reason of temporary closure of a channel or an impediment to navigation shall get underway and depart in the order in which they arrived, unless otherwise directed by Vessel Traffic Service St. Marys River. Vessel Traffic St. Marys River may advance any vessel in the order of departure to expedite the movement of mails, passengers, cargo of a perishable nature, to facilitate passage of vessels through any channel by reason of special circumstance, or to facilitate passage through the St. Marys Falls Canal.

(1200) (d) Traffic Rules. (1) A vessel must proceed only in the established direction of traffic flow in the following waters:

(1201) (i) West Neebish Channel from Buoy "53" to Buoy "1" – downbound traffic only:

(1202) (ii) Pipe Island Course from Sweets Point to Watson ReefsLight-downbound traffic only.

(1203) (iii) Middle Neebish Channel from Buoy "2" to Buoy "76" – upbound traffic only; and

(1204) (iv) Pipe Island Passage to the east of Pipe Island Shoal and north of Pipe Island Twins form Watson Reefs Light to Sweets Point-upbound traffic only.

(1205) (2) A vessel 350 feet or more in length must not overtake or approach within .2 nautical miles of another vessel proceeding in the same direction in the following waterways;

(1206) (i) West Neebish Channel between Nine Point and Munuscong Lake Junction Lighted Bell Buoy;

(1207) (ii) Middle Neebish Channel between Munuscong Lake Junction Lighted Bell Buoy and Nine Mile Point; and

(1208) (iii) Little Rapids Cut from Six Mile Point to Buoy "102".

(1209) (3) When two-way traffic is authorized in Middle Neebish Channel, a vessel 350 feet or more in length must not meet, cross, or overtake another vessel at:

(1210) (i) Johnson Point from Buoy "18" to Buoy "22";

(1211) (ii) Mirre Point from Buoy "25" to Buoy "28" or

(1212) (iii) Stribling Point from Buoy "39" to Buoy "43".

(1213) (4) Paragraph (d)(2) of this section does not apply to a vessel navigating through an ice field.

(1214) (e) **Winter Navigation.** During the winter navigation season, the following waterways are normally closed:

(1215) (1) West Neebish Channel, from Buoy "53" to Buoy "1";

(1216) (2) Pipe Island Passage to the east of Pipe Island Shoal; and

(1217) (3) North of Pipe Island Twins, from Watson Reef Light to Sweets Point.

(1218) (f) **Alternate Winter Navigation Routes.** (1) When West Neebish Channel is closed, Middle Neebish Channel (from Buoy "2" to Buoy "76") will be open either as a two-way route or an alternating one way traffic lane.

(1219) (i) When Middle Neebish Channel is a two-way route;

(1220) (A) An upbound vessel must use the easterly 197 feet of the channel. However, a vessel of draft 20 feet or more must not proceed prior to Vessel Traffic Center approval; and

(1221) (B) A downbound vessel must use the westerly 295 feet of the channel.

(1222) (iii) When Middle Neebish Channel is an alternating one-way traffic lane. A vessel must use the westerly 295 feet of the channel in the established direction of traffic flow.

(1223) (2) When Pipe Island Passage is closed, Pipe Island Course is a two-way route.

(1224) **Note:** The Vessel Traffic Service closes or opens these channels as ice conditions require after giving due considerations to the protection of the marine environment, waterway improvements, aids to navigation, the need for cross channel traffic (e.g., ferries), the availability of icebreakers, and the safety of the island residents who, in the course of their daily business, must use naturally formed ice bridges for transportation to and from the mainland. Under normal seasonal conditions, only one closing each winter and one opening each spring are anticipated. Prior to closing or opening these channels, interested parties including both shipping entities and island residents, will be given at least 72 hours notice by the Coast Guard.

(1225) (g) **Speed Rules.** (1) The following speed limits indicate speed over the ground. Vessels must adhere to the following speed limits:

## Table 162.117(g)–St. Marys River Speed Rules

| Maximum speed limit between | Mph | Knots |
|---|---|---|
| De Tour Reef Light and Sweets Point Light | 14 | 12.2 |
| Round Island Light and Point Aux Frenes Light "21" | 14 | 12.2 |
| Munuscong Lake Lighted Buoy "8" and Everens Point | 12 | 10.4 |
| Everens Point and Reed Point | 9 | 7.8 |
| Reed Point and Lake Nicolet Lighted Buoy "62" | 10 | 8.7 |
| Lake Nicolet Lighted Buoy "62" and Lake Nicolet Light "80" | 12 | 10.4 |
| Lake Nicolet Light "80" and Winter Point (West Neebish Channel) | 10 | 8.7 |
| Lake Nicolet Light "80" and Six Mile Point Range Rear Light | 10 | 8.7 |
| Six Mile Point Range Rear Light and lower limit of the St. Marys Falls Canal | | |
| Upbound | 8 | 7.0 |
| Downbound | 10 | 8.7 |
| Upper limit of the St. Marys Falls Canal and Point Aux Pins Main Light | 12 | 10.4 |

Note: A vessel must not navigate any dredged channel at a speed of less than 5 statute miles per hour (4.3 knots)

(1226) (2) Temporary speed limit regulations may be established by Commanding Officer Vessel Traffic Service St. Marys River. Notice of the temporary speed limits and their effective dates and terminations are published in the **Federal Register** and Local Notice to Mariners. These Temporary speed limits, if imposed, will normally be placed in effect and terminated during the winter navigation season.

(1227) (h) Towing Requirement. A Towing vessel must: (1) Maintain positive control of its tow south of Gros Cap Reef Light;

(1228) (2) Not impede the passage of any other vessel;

(1229) (3) Not tow a vessel of 200 feet or less in length with a tow line longer than 250 feet; and

(1230) (4) Not tow a vessel of 200 feet or more in length with a tow line longer than the length of the towed vessel plus 50 feet.

(1231) **§162.120 Harbors on Lake Michigan.**

(1232) (a) No vessel greater than 40 feet in length may exceed 8 miles per hour in the harbors of Michigan City, Indiana; St. Joseph, South Haven, Saugatuck, Holland (Lake Macatawa), Grand Haven, Muskegon, White Lake, Pentwater, Ludington, Manistee, Portage Lake (Manistee County), Frankfort, Charlevoix, and Petoskey, Michigan.

(1233) (b) No vessel greater than 40 feet in length may exceed 4 miles per hour in the harbors of Menominee, Michigan and Wisconsin; Algoma, Kewaunee, Two Rivers, Manitowoc, Sheboygan, Port Washington, Milwaukee, Racine, Kenosha and Green Bay, Wisconsin; and Waukegan, Illinois.

(1234) **§162.125 Sturgeon Bay and the Sturgeon Bay Ship Canal, Wisconsin.**

(1235) (a) In the Sturgeon Bay Ship Canal:

(1236) (1) No vessel may exceed 5 miles per hour.

(1237) (2) No vessel greater than 150 feet in length (including tug and tow combinations) may come about.

(1238) (3) No vessel 65 feet or greater in length (including tug and tow combinations) may either:

(1239) (i) Enter or pass through the canal two or more abreast; or

(1240) (ii) Overtake another vessel.

(1241) (4) No vessel may anchor or moor unless given permission to do so by the Captain of the Port.

(1242) (5) Each vessel must keep to the center, except when meeting or overtaking another vessel.

(1243) (b) In Sturgeon Bay and the Sturgeon Bay Ship Canal:

(1244) (1) Each laden vessel under tow must be towed with at least two towlines. Each towline must be shortened to the extent necessary to provide maximum control of the tow.

(1245) (2) Each unladen vessel may be towed with one towline.

(1246) (3) No towline may exceed 100 feet in length.

(1247) (4) No vessel may tow another vessel alongside.

(1248) (5) No vessel may tow a raft greater than 50 feet in width.

(1249) **Note.**–The Corps of Engineers also has regulations dealing with these areas in 33 CFR 207.

(1250) **§162.130 Connecting waters from Lake Huron to Lake Erie; general rules.**

(1251) (a) Purpose. The regulations in sections 162.130 through 162.140 prescribe rules for vessel operation in U.S. waters connecting Lake Huron to Lake Erie (including the River Rouge) to prevent collisions and groundings, to protect waterway improvements, and to protect these waters from environmental harm resulting from collisions and groundings.

(1252) **Note.**–The Canadian Government has issued similar regulations which apply in the Canadian portion of the waterway. Provisions which apply only in Canadian waters are noted throughout the text.

(1253) (b) Applicability. (1) Unless otherwise specified, the rules in sections 162.130 through 162.140 apply to all U.S. vessels and all other vessels in U.S. waters.

(1254) (2) The speed rules in §162.138 apply to vessels 20 meters or more in length.

(1255) (3) The communications rules in §162.132, the traffic rules in §162.134, except for §162.134(c)(2), and the anchorage rules in §162.136 apply to the following vessels:

(1256) (i) Vessels of 20 meters or more in length;

(1257) (ii) Commercial vessels more than 8 meters in length engaged in towing another vessel astern, alongside, or by pushing ahead; and

(1258) (iii) Each dredge and floating plant.

(1259) (4) The traffic rules contained in §162.134(c)(2) apply to the following vessels:

(1260) (i) Sailing vessels of 20 meters or more in length;

(1261) (ii) Power driven vessels of 55 meters or more in length;

(1262) (iii) Vessels engaged in towing another vessel astern, alongside or by pushing ahead; and

(1263) (iv) Each dredge and floating plant.

(1264) (c) Definitions. As used in §§162.130 through 162.140–

(1265) "Captain of the Port" means the United States Coast Guard Captain of the Port of Detroit, Michigan.

(1266) "Detroit River" means the connecting waters from Windmill Point Light to the lakeward limits of the improved navigation channels at the head of Lake Erie.

(1267) "District Commander" means, Commander, Ninth Coast Guard District, Cleveland, Ohio.

(1268) "Master" means the licensed master or operator, the person designated by the master or operator to navigate the vessel, or, on a vessel not requiring licensed personnel, the person in command of the vessel.

(1269) "River Rouge" means the waters of the Short Cut Canal and the River Rouge from Detroit Edison Cell Light 1 to the head of navigation.

(1270) "St. Clair River" means the connecting waters from the lakeward limit of the improved navigation channel at the lower end of Lake Huron to St. Clair Flats Canal Light 2.

(1271) "SARNIA TRAFFIC" means the Canadian Coast Guard Traffic center at Sarnia, Ontario.

(1272) (d) Laws and regulations not affected. The regulations in §§162.130 through 162.140 do not relieve the owners or operators of vessels from complying with any other laws or regulations relating to navigation on the Great Lakes and their connecting or tributary waters.

(1273) (e) Delegations. The District Commander, in coordination with appropriate Canadian officials, may make local arrangements that do not conflict with these regulations in the interest of safety of operations, to facilitate traffic movement and anchorage, to avoid disputes as to jurisdiction and to take necessary action to render assistance in emergencies. This authority may be redelegated.

(1274) **§162.132 Connecting waters from Lake Huron to Lake Erie; communications rules.**

(1275) (a) Radio Listening watch. The master of each vessel required to comply with this section shall continuously monitor–

(1276) (1) Channel 11 (156.55 MHz) between Lake Huron Cut Lighted Buoy 11 and Lake St. Clair Light; and

(1277) (2) Channel 12 (156.60 MHz) between Lake St. Clair Light and Detroit River Light.

(1278) (b) Radiotelephone equipment. Reports required by this section shall be made by the master using a radiotelephone capable of operation on a vessel's navigation bridge, or in the case of a dredge, from its main control station.

(1279) (c) English language. Reports required by this section shall be made in the English language.

(1280) (d) Traffic reports. (1) Reports required by this section shall be made to SARNIA TRAFFIC on the frequency designated for the radio listening watch in paragraph (a) of this section.

(1281) (2) Reports shall include the name of the vessel, location, intended course of action, and ETA at next reporting point.

(1282) (e) Permanent Reporting Points. The master of each vessel to which this section applies shall report as required by paragraph (d) of this section at the following locations:

(1283) 30 Minutes North of Lake Huron Cut Lighted Buoy 11, downbound only.

(1284) Lake Huron Cut Lighted Buoy 7, downbound only.

(1285) Lake Huron Cut Lighted Buoy 1, upbound only.

(1286) St. Clair/Black River Junction Light, upbound and downbound.

(1287) Stag Island Upper Light, upbound only.

(1288) Marine City Salt Dock Light, upbound and downbound.

(1289) Grand Pointe Light 23, downbound only.

(1290) St. Clair Flats Canal Light 2, upbound only.

(1291) Lake St. Clair Light, upbound and downbound.

(1292) Belle Isle Light, downbound only.

(1293) Grassy Island Light, upbound and downbound.

(1294) Detroit River Light, upbound and downbound.

(1295) (f) Additional Traffic Reports.

(1296) (1) A report shall be made upon leaving any dock, mooring, or anchorage, in the Detroit River, Lake St. Clair, and the St. Clair River except for–

(1297) (i) Ferries on regular runs; and

(1298) (ii) Vessels in the River Rouge.

(1299) (2) A report shall be made before maneuvering to come about.

(1300) (3) A report shall be made–

(1301) (i) 20 minutes before entering or departing the River Rouge; and

(1302) (ii) Immediately before entering or departing the River Rouge.

(1303) (g) Report of impairment or other hazard. The master of a vessel shall report to SARNIA TRAFFIC as soon as possible:

(1304) (1) Any condition on the vessel that may impair its navigation, including but not limited to: fire, defective steering equipment, or defective propulsion machinery.

(1305) (2) Any tow that the towing vessel is unable to control, or can control only with difficulty.

(1306) (h) Exemptions. Compliance with this section is not required when a vessel's radiotelephone equipment has failed.

(1307) **§162.134 Connecting waters from Lake Huron to Lake Erie, traffic rules.**

(1308) (a) Detroit River. The following traffic rules apply in the Detroit River:

(1309) (1) The West Outer Channel is restricted to downbound vessels.

(1310) (2) The Livingstone Channel, west of Bois Blanc Island, is restricted to downbound vessels.

(1311) **Note.**–The Amherstburg Channel, in Canadian waters east of Bois Blanc Island, is normally restricted to upbound vessels. No vessel may proceed downbound in the Amherstburg Channel without authorization from the Regional Director General.

(1312) (3) Between Fighting Island Channel South Light and Bar Point Pier Light 29D, no vessels shall meet or overtake in such a manner that more than two vessels would be abreast at any time.

(1313) (4) Between the west end of Belle Isle and Peche Island Light, vessels may overtake vessels engaged in towing.

(1314) (b) River Rouge. In the River Rouge, no vessel shall overtake another vessel.

(1315) (c) St. Clair River. The following traffic rules apply in the St. Clair River:

(1316) (1) Between St. Clair Flats Canal Light 2 and Russell Island Light 33, vessels may only overtake vessels engaged in towing.

(1317) (2) Between Lake Huron Cut Lighted Buoy 1 and Port Huron Traffic Lighted Buoy there is a zone of alternating one way traffic. Masters shall coordinate their movements in accordance with the following rules;

(1318) (i) Vessels shall not overtake.

(1319) (ii) Vessels shall not come about.

(1320) (iii) Vessels shall not meet.

(1321) (iv) Downbound vessels which have passed Lake Huron Cut Lighted Buoy 7 have the right of way over upbound vessels which have not reached the Port Huron Traffic Lighted Buoy. Upbound vessels awaiting transit of downbound vessels will maintain position south of the Port Huron Traffic Lighted Buoy.

(1322) (v) Vessels transiting the zone shall coordinate passage by using communication procedures in §162.132.

(1323) (vi) Transiting vessels shall have the right of way over moored vessels getting underway within the zone.

(1324) (d) In the waters described in §162.130(a), the District Commander or Captain of the Port may establish temporary traffic rules for reasons which include but are not limited to: channel obstructions, winter navigation, unusual weather conditions, or unusal water levels.

(1325) (e) The requirements of this section do not apply to public vessels of the U.S. or Canada engaged in icebreaking or servicing aids to navigation or to vessels engaged in river and harbor improvement work.

(1326) (f) The prohibitions in this section on overtaking in certain areas do not apply to vessels operating in the nondisplacement mode. In this section, "nondisplacement mode" means a mode of operation in which the vessel is supported by hydrodynamic forces, rather than displacement of its weight in the water, to an extent such that the wake which would otherwise be generated by the vessel is significantly reduced.

(1327) **§162.136 Connecting waters from Lake Huron to Lake Erie; anchorage grounds.**

(1328) (a) In the Detroit River, vessels shall be anchored so as not to swing into the channel or across steering courses.

(1329) **Note.**–There is an authorized anchorage in Canadian waters just above Fighting Island and an authorized anchorage in U.S. waters south of Belle Isle (33 CFR 110.206).

(1330) (b) In the St. Clair River, vessels shall be anchored so as not to swing into the channel or across steering courses.

(1331) **§162.138 Connecting waters from Lake Huron to Lake Erie; speed rules.**

(1332) (a) *Maximum speed limit for vessels in normal displacement mode.* (1) Except when required for the safety of the vessel or any other vessel, vessels of 20 meters or more in length operating in normal displacement mode shall proceed at a speed not greater than–

(1333) (i) 12 statute miles per hour (10.4 knots) between Fort Gratiot Light and St. Clair Flats Canal Light 2;

(1334) (ii) 12 statute miles per hour (10.4 knots) between Peche Island Light and Detroit River Light; and

(1335) (iii) 4 statute miles per hour (3.5 knots) in the River Rouge.

(1336) (2) The maximum speed limit is 5.8 statute miles per hour (5 knots) in the navigable channel south of Peche Island (under Canadian jurisdiction).

(1337) (b) *Maximum speed limit for vessels operating in nondisplacement mode.* (1) Except when required for the safety of the vessel or any other vessel, vessels 20 meters or more in length but under 100 gross tons operating in the nondisplacement mode and meeting the requirements set out in paragraph (c) of this section may operate at a speed not exceeding 40 miles per hour (34.8 knots)–

(1338) (i) During daylight hours (sunrise to sunset);

(1339) (ii) When conditions otherwise safely allow; and

(1340) (iii) When approval has been granted by the Coast Guard Captain of the Port, Detroit or Commander of the Ninth Coast Guard District prior to each transit of the area.

(1341) (2) In this section, "nondisplacement mode" means a mode of operation in which the vessel is supported by hydrodynamic forces, rather than displacement of its weight in the water, to an extent such that the wake which would otherwise be generated by the vessel is significantly reduced.

(1342) (c) *Unsafe vessels.* The Captain of the Port or the District Commander may deny approval for operations under paragraph (b) of this section if it appears that the design and operating characteristics of the vessels in question are not safe for the designated waterways, or if it appears that operations under this section have become unsafe for any reason.

(1343) (d) *Temporary speed limits.* The District Commander may temporarily establish speed limits or temporarily amend existing speed limit regulations on the waters described in §162.130(a).

(1344) **§162.140 Connecting waters from Lake Huron to Lake Erie; miscellaneous rules.**

(1345) (a) Rules for towing vessels. (1) A towing vessel may drop or anchor its tows only in accordance with the provisions of 162.136.

(1346) (2) A towing vessel engaged in arranging its tow shall not obstruct the navigation of other vessels.

(1347) (b) Pilots. In the St. Clair River between Lake Huron Cut Lighted Buoy 1 and Port Huron Traffic Lighted Buoy, vessels shall not take on, discharge, or exchange pilots unless weather conditions would make the maneuver unsafe in the customary pilot area.

(1348) **§162.145 Monroe Harbor, Michigan.**

(1349) (a) In the lake channel, no vessel greater than 40 feet in length may exceed 10 miles per hour.

(1350) (b) In the river channel:

(1351) (1) No vessel greater than 40 feet in length may exceed 6 miles per hour.

(1352) (2) No vessel may use a towline exceeding 200 feet in length.

(1353) **§162.150 Maumee Bay and River, Ohio.**

(1354) (a) In Maumee Bay (lakeward of Maumee River Lighted Buoy 49), no vessel greater than 100 feet in length may exceed 12 miles per hour.

(1355) (b) In Maumee River (inward of Maumee River Lighted Buoy 49):

(1356) (1) No vessel greater than 40 feet in length may exceed 6 miles per hour.

(1357) (2) No vessel greater than 100 feet in length (including tug and tow combinations) may overtake another vessel.

(1358) **§162.155 Sandusky and Huron Harbors, Ohio.**

(1359) (a) In Sandusky Harbor, no vessel greater than 40 feet in length may exceed 10 miles per hour.

(1360) (b) In Huron Harbor, no vessel greater than 40 feet in length may exceed 6 miles per hour, except in the outer harbor where no vessel greater than 40 feet in length may exceed 10 miles per hour.

(1361) **Note.**–The Corps of Engineers also has regulations dealing with these areas in 33 CFR 207.

(1362) **§162.160 Vermilion, Lorain, Cleveland, Fairport, Ashtabula, and Conneaut Harbors, Ohio.**

(1363) (a) In Vermilion Harbor, no vessel may exceed 6 miles per hour.

(1364) (b) In Lorain, Cleveland, Fairport, Ashtabula, and Conneaut Harbors, no vessel may exceed 6 miles per hour, except in the outer harbors, where no vessel may exceed 10 miles per hour.

(1365) **Note.**–The Corps of Engineers also has regulations dealing with these areas in 33 CFR 207.

(1366) **§162.165 Buffalo and Rochester Harbors, New York.**

(1367) In Buffalo and Rochester Harbors, no vessel may exceed 6 miles per hour, except in the outer harbors where no vessel may exceed 10 miles per hour.

(1368) **Note.**–The Corps of Engineers also has regulations dealing with these areas in 33 CFR 207.

(1369) **§162.175 Black Rock Canal and Lock at Buffalo, New York.**

(1370) In the Black Rock Canal and Lock, no vessel may exceed miles per hour.

(1371) **Note.**–The Corps of Engineers also has regulations dealing with these areas in 33 CFR 207.

**Part 164–Navigation Safety Regulations** (in part). For a complete description of this part see 33 CFR 164.

(1372) **§164.01 Applicability.**

(1373) (a) This part (except as specifically limited herein) applies to each self-propelled vessel of 1600 or more gross tons (except foreign vessels described in §164.02) when it is operating in the navigable waters of the United States except the St. Lawrence Seaway.

(1374) (b) Sections 164.70 through 164.82 of this part apply to each towing vessel of 12 meters (39.4 feet) or more in length operating in the navigable waters of the United States other than the St. Lawrence Seaway; except that a towing vessel is exempt from the requirements of §164.72 if it is–

(1375) (1) Used solely within a limited geographic area, such as a fleeting-area for barges or a commercial facility, and used solely for restricted service, such as making up or breaking up larger tows;

(1376) (2) Used solely for assistance towing as defined by 46 CFR 10.103;

(1377) (3) Used solely for pollution response; or

(1378) (4) Any other vessel exempted by the Captain of the Port (COTP). The COTP, upon written request, may, in writing, exempt a vessel from §164.72 for a specified route if he or she decides that exempting it would not allow its unsafe navigation under anticipated conditions.

(1379) **§164.02 Applicability exception for foreign vessels.**

(1380) (a) This part (including §§164.38 and 164.39) does not apply to vessels that:

(1381) (1) Are not destined for, or departing from, a port or place subject to the jurisdiction of the United States; and

(1382) (2) Are in:

(1383) (i) Innocent passage through the territorial sea of the United States; or

(1384) (ii) Transit through navigable waters of the United States which form a part of an international strait.

(1385) **§164.03 Incorporation by reference.**

(1386) (a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in paragraph (b) of this section, the Coast Guard must publish notice of change in the Federal Register and the material must be available to the public. All approved material is on file at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC, and at the U.S. Coast Guard, Marine Environmental Protection Division (G-MEP), Room 2100, 2100 Second Street, SW., Washington, DC 20593-0001 and is available from the sources indicated in paragraph (b) of this section.

(1387) (b) The materials approved for incorporation by reference in this part and the sections affected are as follows:

(1388) *American Petroleum Institute (API)*, 1220 L Street NW., Washington, DC 20005

(1389) API Specifications 9A, Specification for Wire Rope, Section 3, Properties and Tests for Wire and Wire Rope, May 28, 1984 ..... **164.74**

(1390) *American Society for Testing and Materials (ASTM)*, 1916 Race Street, Philadelphia, PA 19103

(1391) ASTM D4268-93, Standard Test Method for Testing Fiber Rope ..... **164.74**

(1392) *Cordage Institute*, 350 Lincoln Street, Hingham, MA 02043

(1393) CIA-3, Standard Test Methods for Fiber Rope Including Standard Terminations, Revised, June 1980 ..... **164.74**

(1394) *International Maritime Organization (IMO)*, 4 Albert Embankment, London SE1 7SR, U.K. IMO Resolution A342(IX), Recommendation on Performance Standards for Automatic Pilots, adopted November 12, 1975 ..... **164.13**

(1395) *International Telecommunication Union Radiocommunication Bureau (ITU-R)*, Place de Nations CH-1211 Geneva 20 Switzerland

(1396) (1) ITU-R Recommendation M.821, Optional Expansion of the Digital Selective-Calling System for Use in the Maritime Mobile Service, 1992 ..... **164.43**

(1397) (2) ITU-R Recommendation M.825, Characteristics of a Transponder System Using Digital Selective-Calling Techniques for Use with Vessel Traffic Services and Ship-to-Ship Identification, 1992 ..... **164.43**

(1398) *Radio Technical Commission for Maritime Services*, 655 Fifteenth Street, NW., Suite 300, Washington, DC 20005

(1399) (1) RTCM Paper 12-78/DO-100, Minimum Performance Standards, Loran C Receiving Equipment, 1977 ..... **164.41**

(1400) (2) RTCM Paper 194-93/SC104-STD, RTCM Recommended Standards for Differential NAVSTAR GPS Service, Version 2.1, 1994 ..... **164.43**

(1401) (3) RTCM Paper 71-95/SC112-STD, RTCM Recommended Standards for Marine Radar Equipment Installed on Ships of Less Than 300 Tons Gross Tonnage, Version 1.1, October 10, 1995 ..... **164.72**

(1402) (4) RTCM Paper 191-93/SC112-X, RTCM Recommended Standards for Maritime Radar Equipment Installed on Ships of 300 Tons Gross Tonnage and Upwards, Version 1.2, December 20, 1993 ..... **164.72**

(1403) **§164.11 Navigation under way: General.**

(1404) The owner, master, or person in charge of each vessel underway shall ensure that:

(1405) (a) The wheelhouse is constantly manned by persons who–

(1406) (1) Direct and control the movement of the vessel; and

(1407) (2) Fix the vessel's position;

(1408) (b) Each person performing a duty described in paragraph (a) of this section is competent to perform that duty;

(1409) (c) The position of the vessel at each fix is plotted on a chart of the area and the person directing the movement of the vessel is informed of the vessel's position;

(1410) (d) Electronic and other navigational equipment, external fixed aids to navigation, geographic reference points, and hydrographic contours are used when fixing the vessel's position;

(1411) (e) Buoys alone are not used to fix the vessel's position;

(1412) **Note.**–Buoys are aids to navigation placed in approximate positions to alert the mariner to hazards to navigation or to indicate the orientation of a channel. Buoys may not maintain an exact position because strong or varying currents, heavy seas, ice, and collisions with vessels can move or sink them or set them adrift. Although buoys may corroborate a position fixed by other means, buoys cannot be used to fix a position: however, if no other aids are available, buoys alone may be used to establish an estimated position.

(1413) (f) The danger of each closing visual or each closing radar contact is evaluated and the person directing the movement of the vessel knows the evaluation;

(1414) (g) Rudder orders are executed as given;

(1415) (h) Engine speed and direction orders are executed as given;

(1416) (i) Magnetic variation and deviation and gyrocompass errors are known and correctly applied by the person directing the movement of the vessel;

(1417) (j) A person whom he has determined is competent to steer the vessel is in the wheelhouse at all times (See also 46 U.S.C. 8702(d), which requires an able seaman at the wheel on U.S. vessels of 100 gross tons or more in narrow or crowded waters during low visibility.);

(1418) (k) If a pilot other than a member of the vessel's crew is employed, the pilot is informed of the draft, maneuvering characteristics, and peculiarities of the vessel and of any abnormal circumstances on the vessel that may affect its safe navigation.

(1419) (1) Current velocity and direction for the area to be transited are known by the person directing the movement of the vessel;

(1420) (m) Predicted set and drift are known by the person directing movement of the vessel;

(1421) (n) Tidal state for the area to be transited is known by the person directing movement of the vessel;

(1422) (o) The vessel's anchors are ready for letting go;

(1423) (p) The person directing the movement of the vessel sets the vessel's speed with consideration for–

(1424) (1) The prevailing visibility and weather conditions;

(1425) (2) The proximity of the vessel to fixed shore and marine structures;

(1426) (3) The tendency of the vessel underway to squat and suffer impairment of maneuverability when there is small underkeel clearance;

(1427) (4) The comparative proportions of the vessel and the channel;

(1428) (5) The density of marine traffic;

(1429) (6) The damage that might be caused by the vessel's wake;

(1430) (7) The strength and direction of the current; and

(1431) (8) Any local vessel speed limit;

(1432) (q) The tests required by §164.25 are made and recorded in the vessel's log; and

(1433) (r) The equipment required by this part is maintained in operable condition.

(1434) (s) Upon entering U.S. waters, the steering wheel or lever on the navigating bridge is operated to determine if the steering equipment is operating properly under manual control, unless the vessel has been steered under manual control from the navigating bridge within the preceding 2 hours, except when operating on the Great Lakes and their connecting and tributary waters.

(1435) (t) At least two of the steering-gear power units on the vessel are in operation when such units are capable of simultaneous operation, except when the vessel is sailing on the Great Lakes and their connecting and tributary waters, and except as required by paragraph (u) of this section.

(1436) (u) On each passenger vessel meeting the requirements of the International Convention for the Safety of Life at Sea, 1960 (SOLAS 60) and on each cargo vessel meeting the requirements of SOLAS 74 as amended in 1981, the number of steering-gear power units necessary to move the rudder from 35° on either side to 30° on the other in not more than 28 seconds must be in simultaneous operation.

(1437) **§164.13 Navigation underway: tankers.**

(1438) (a) As used in this section, "tanker" means a self-propelled tank vessel, including integrated tug barge combinations, constructed or adapted primarily to carry oil or hazardous material in bulk in the cargo spaces and inspected and certificated as a tanker.

(1439) (b) Each tanker must have an engineering watch capable of monitoring the propulsion system, communicating with the bridge, and implementing manual control measures immediately when necessary. The watch must be physically present in the machinery spaces or in the main control space and must consist of at least a licensed engineer.

(1440) (c) Each tanker must navigate with at least two licensed deck officers on watch on the bridge, one of whom may be a pilot. In waters where a pilot is required, the second officer, must be an individual licensed and assigned to the vessel as master, mate, or officer in charge of a navigational watch, who is separate and distinct from the pilot.

(1441) (d) Except as specified in paragraph (e) of this section, a tanker may operate with an auto pilot engaged only if all of the following conditions exist:

(1442) (1) The operation and performance of the automatic pilot conforms with the standards recommended by the International Maritime Organization in IMO Resolution A.342(IX).

(1443) (2) A qualified helmsman is present at the helm and prepared at all times to assume manual control.

(1444) (3) The tanker is not operating in any of the following areas:

(1445) (i) The areas of the traffic separation schemes specified in subchapter P of this chapter.

(1446) (ii) The portions of a shipping safety fairway specified in part 166 of this chapter.

(1447) (iii) An anchorage ground specified in part 110 of this chapter.

(1448) (iv) An area within one-half nautical mile of any U.S. shore.

(1449) **§164.15 Navigation bridge visibility.**

(1450) (a) The arrangement of cargo, cargo gear, and trim of all vessels entering or departing from U.S. ports must be such that the field of vision from the navigation bridge conforms as closely as possible to the following requirements:

(1451) (1) From the conning position, the view of the sea surface must not be obscured by more than the lesser of two ship lengths or 500 meters (1,640 feet) from dead ahead to 10 degrees on either side of the vessel. Within this arc of visibility any blind sector caused by cargo, cargo gear, or other permanent obstruction must not exceed 5 degrees.

(1452) (2) From the conning position, the horizontal field of vision must extend over an arc from at least 22.5 degrees abaft the beam on one side of the vessel, through dead ahead, to at least 22.5 degrees abaft the beam on the other side of the vessel. Blind sectors forward of the beam caused by cargo, cargo gear, or other permanent obstruction must not exceed 10 degrees each, nor total more than 20 degrees, including any blind sector within the arc of visibility described in paragraph (a)(1) of this section.

(1453) (3) From each bridge wing, the field of vision must extend over an arc from at least 45 degrees on the opposite bow, through dead ahead, to at least dead astern.

(1454) (4) From the main steering position, the field of vision must extend over an arc from dead ahead to at least 60 degrees on either side of the vessel.

(1455) (b) A clear view must be provided through at least two front windows at all times regardless of weather conditions.

(1456) **§164.19 Requirements for vessels at anchor.**

(1457) The master or person in charge of each vessel that is anchored shall ensure that–

(1458) (a) A proper anchor watch is maintained;

(1459) (b) Procedures are followed to detect a dragging anchor; and

(1460) (c) Whenever weather, tide, or current conditions are likely to cause the vessel's anchor to drag, action is taken to ensure the safety of the vessel, structures, and other vessels, such as being ready to veer chain, let go a second anchor, or get underway using the vessel's own propulsion or tug assistance.

(1461) **§164.25 Tests before entering or getting underway.**

(1462) (a) Except as provided in paragraphs (b) and (c) of this section no person may cause a vessel to enter into or get underway on the navigable waters of the United States unless no more than 12 hours before entering or getting underway, the following equipment has been tested:

(1463) (1) Primary and secondary steering gear. The test procedure includes a visual inspection of the steering gear and its connecting linkage, and, where applicable, the operation of the following:

(1464) (i) Each remote steering gear control system.

(1465) (ii) Each steering position located on the navigating bridge.

(1466) (iii) The main steering gear from the alternative power supply, if installed.

(1467) (iv) Each rudder angle indicator in relation to the actual position of the rudder.

(1468) (v) Each remote steering gear control system power failure alarm.

(1469) (vi) Each remote steering gear power unit failure alarm.

(1470) (vii) The full movement of the rudder to the required capabilities of the steering gear.

(1471) (2) All internal vessel control communications and vessel control alarms.

(1472) (3) Standby or emergency generator, for as long as necessary to show proper functioning, including steady state temperature and pressure readings.

(1473) (4) Storage batteries for emergency lighting and power systems in vessel control and propulsion machinery spaces.

(1474) (5) Main propulsion machinery, ahead and astern.

(1475) (b) Vessels navigating on the Great Lakes and their connecting and tributary waters, having once completed the test requirements of this sub-part, are considered to remain in compliance until arriving at the next port of call on the Great Lakes.

(1476) (c) Vessels entering the Great Lakes from the St. Lawrence Seaway are considered to be in compliance with this sub-part if the required tests are conducted preparatory to or during the passage of the St. Lawrence Seaway or within one hour of passing Wolfe Island.

(1477) (d) No vessel may enter, or be operated on the navigable waters of the United States unless the emergency steering drill described below has been conducted within 48 hours prior to entry and logged in the vessel logbook, unless the drill is conducted and logged on a regular basis at least once every three months. This drill must include at a minimum the following:

(1478) (1) Operation of the main steering gear from within the steering gear compartment.

(1479) (2) Operation of the means of communications between the navigating bridge and the steering compartment.

(1480) (3) Operation of the alternative power supply for the steering gear if the vessel is so equipped.

(1481) **§164.30 Charts, publications, and equipment: General.**

(1482) No person may operate or cause the operation of a vessel unless the vessel has the marine charts, publications, and equipment as required by §§164.33 through 164.41 of this part.

(1483) **§164.33 Charts and publications.**

(1484) (a) Each vessel must have the following:

(1485) (1) Marine charts of the area to be transited, published by the National Ocean Service, U.S. Army Corps of Engineers, or a river authority that–

(1486) (i) Are of a large enough scale and have enough detail to make safe navigation of the area possible; and

(1487) (ii) Are currently corrected.

(1488) (2) For the area to be transited, a currently corrected copy of, or applicable currently corrected extract from, each of the following publications:

(1489) (i) U.S. Coast Pilot.

(1490) (ii) Coast Guard Light List.

(1491) (3) For the area to be transited, the current edition of, or applicable current extract from:

(1492) (i) Tide tables published by the National Ocean Service.

(1493) (ii) Tidal current tables published by the National Ocean Service, or river current publication issued by the U.S. Army Corps of Engineers, or a river authority.

(1494) (b) As an alternative to the requirements for paragraph (a) of this section, a marine chart or publication, or applicable extract, published by a foreign government may be substituted for a U.S. chart and publication required by this section. The chart must be of large enough scale and have enough detail to make safe navigation of the area possible, and must be currently corrected. The publication, or applicable extract, must singly or in combination contain similar information to the U.S. Government publication to make safe navigation of the area possible. The publication, or applicable extract must be currently corrected, with the exceptions of tide and tidal current tables, which must be the current editions.

(1495) (c) As used in this section, "currently corrected" means corrected with changes contained in all Notices to Mariners published by National Imagery and Mapping Agency, or an equivalent foreign government publication, reasonably available to the vessel, and that is applicable to the vessel's transit.

(1496) **§164.35 Equipment: All vessels.**

(1497) Each vessel must have the following:

(1498) (a) A marine radar system for surface navigation.

(1499) (b) An illuminated magnetic steering compass, mounted in a binnacle, that can be read at the vessel's main steering stand.

(1500) (c) A current magnetic compass deviation table or graph or compass comparison record for the steering compass, in the wheelhouse.

(1501) (d) A gyrocompass.

(1502) (e) An illuminated repeater for the gyrocompass required by paragraph (d) of this section that is at the main steering stand, unles that gyrocompass is illuminated and is at the main steering stand.

(1503) (f) An illuminated rudder angle indicator in the wheelhouse.

(1504) (g) The following maneuvering information prominently displayed on a fact sheet in the wheelhouse:

(1505) (1) A turning circle diagram to port and starboard that shows the time and distance and advance and transfer required to alter course 90 degrees with maximum rudder angle and constant power settings, for either full and half speeds, or for full and slow speeds. For vessels whose turning circles are essentially the same for both directions, a diagram showing a turning circle in one direction, with a note on the diagram stating that turns to port and starboard are essentially the same, may be substituted.

(1506) (2) The time and distance to stop the vessel from either full and half speeds, or from full and slow speeds, while maintaining approximately the initial heading with minimum application of rudder.

(1507) (3) For each vessel with a fixed propeller, a table of shaft revolutions per minute for a representative range of speeds.

(1508) (4) For each vessel with a controllable pitch propeller, a table of control settings for a representative range of speeds.

(1509) (5) For each vessel that is fitted with an auxiliary device to assist in maneuvering, such as a bow thruster, a table of vessel speeds at which the auxiliary device is effective in maneuvering the vessel.

(1510) (6) The maneuvering information for the normal load and normal ballast condition for–

(1511) (i) Calm weather-wind 10 knots or less, calm sea;

(1512) (ii) No current;

(1513) (iii) Deep water conditions-water depth twice the vessel's draft or greater; and

(1514) (iv) Clean hull.

(1515) (7) At the bottom of the fact sheet, the following statement:

(1516) **Warning.**

(1517) The response of the (name of the vessel) may be different from that listed above if any of the following conditions, upon which the maneuvering information is based, are varied:

(1518) (1) Calm weather-wind 10 knots or less, calm sea;

(1519) (2) No current;

(1520) (3) Water depth twice the vessel's draft or greater;

(1521) (4) Clean hull; and

(1522) (5) Intermediate drafts or unusual trim.

(1523) (h) An echo depth sounding device.

(1524) (i) A device that can continuously record the depth readings of the vessel's echo depth sounding device, except when operating on the Great Lakes and their connecting and tributary waters.

(1525) (j) Equipment on the bridge for plotting relative motion.

(1526) (k) Simple operating instructions with a block diagram, showing the changeover procedures for remote steering gear control systems and steering gear power units, permanently displayed on the navigating bridge and in the steering gear compartment.

(1527) (1) An indicator readable from the centerline conning position showing the rate of revolution of each propeller, except when operating on the Great Lakes and their connecting and tributary waters.

(1528) (m) If fitted with controllable pitch propellers, an indicator readable from the centerline conning position showing the pitch and operational mode of such propellers, except when operating on the Great Lakes and their connecting and tributary waters.

(1529) (n) If fitted with lateral thrust propellers, an indicator readable from the centerline conning position showing the direction and amount of thrust of such propellers, except when operating on the Great Lakes and their connecting and tributary waters.

(1530) (o) A telephone or other means of communication for relaying headings to the emergency steering station. Also, each vessel of 500 gross tons and over and constructed on or after June 9, 1995 must be provided with arrangements for supplying visual compass-readings to the emergency steering station.

(1531) **§164.37 Equipment: Vessels of 10,000 gross tons or more.**

(1532) (a) Each vessel of 10,000 gross tons or more must have in addition to the radar system under §164.35(a), a second marine radar system that operates independently of the first.

(1533) **Note.**–Independent operation means two completely separate systems, from separate branch power supply circuits or distribution panels to antennas, so that failure of any component of one system will not render the other system inoperative.

(1534) (b) On each tanker of 10,000 gross tons or more that is subject to 46 U.S.C. 3708, the dual radar system required by this part must have a short range capability and a long range capability; and each radar must have true north features consisting of a display that is stabilized in azimuth.

(1535) **§164.38 Automatic radar plotting aids (ARPA).** (See 33 CFR 164.)

(1536) **§164.39 Steering gear: Foreign tankers.**

(1537) (a) This section applies to each foreign tanker of 10,000 gross tons or more, except a public vessel, that–

(1538) (1) Transfers oil at a port or place subject to the jurisdiction of the United States; or

(1539) (2) Otherwise enters or operates in the navigable waters of the United States, except a vessel described by §164.02 of this part.

(1540) (b) *Definitions.* The terms used in this section are as follows:

(1541) *Constructed* means the same as in Chapter II-1, Regulations 1.1.2 and 1.1.3.1, of SOLAS 74.

(1542) *Existing tanker* means a tanker–

(1543) (1) For which the building contract is placed on or after June 1, 1979;

(1544) (2) In the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after January 1, 1980;

(1545) (3) The delivery of which occurs on or after June 1, 1982; or

(1546) (4) That has undergone a major conversion contracted for on or after June 1, 1979; or construction of which was begun on or after January 1, 1980, or completed on or after June 1, 1982.

(1547) *Public vessel, oil, hazardous materials, and foreign vessel* mean the same as in 46 U.S.C. 2101.

(1548) *SOLAS 74* means the International Convention for the Safety of Life at Sea, 1974, as amended.

(1549) *Tanker* means a self-propelled vessel defined as a tanker by 46 U.S.C. 2101(38) or as a tank vessel by 46 U.S.C. 2101(39).

(1550) (c) Each tanker constructed on or after September 1, 1984, must meet the applicable requirements of Chapter II-1, Regulations 29 and 30, of SOLAS 74.

(1551) (d) Each tanker constructed before September 1, 1984, must meet the requirements of Chapter II-1, Regulation 29.19, of SOLAS 74.

(1552) (e) Each tanker of 40,000 gross tons or more, constructed before September 1, 1984, that does not meet the single-failure criterion of Chapter II-1, Regulation 29.16, of SOLAS 74, must meet the requirements of Chapter II-1, Regulation 29.20, of SOLAS 74.

(1553) (f) Each tanker constructed before September 1, 1984, must meet the applicable requirements of Chapter II-1, Regulations 29.14 and 29.15, of SOLAS 74.

(1554) **§164.40 Devices to indicate speed and distance.**

(1555) (a) Each vessel required to be fitted with an Automatic Radar Plotting Aid (ARPA) under §164.38 of this part must be fitted with a device to indicate speed and distance of the vessel either through the water or over the ground.

(1556) (1) Each tank vessel constructed before September 1, 1984, operating on the navigable waters of the United States–

(1557) (i) If of 40,000 gross tons or more, by January 1, 1985;

(1558) (ii) If of 10,000 gross tons or more but less than 40,000 gross tons, by January 1, 1986.

(1559) (2) Each self-propelled vessel constructed before September 1, 1984, that is not a tank vessel, operating on the navigable waters of the United States–

(1560) (i) If of 40,000 gross tons or more, by September 1, 1986;

(1561) (ii) If of 20,000 gross tons or more, but less than 40,000 gross tons, by September 1, 1987;

(1562) (iii) If of 15,000 gross tons or more, but less than 20,000 gross tons, by September 1, 1988.

(1563) (b) The device must meet the following specifications:

(1564) (1) The display must be easily readable on the bridge by day or night.

(1565) (2) Errors in the indicated speed, when the vessel is operating free from shallow water effect, and from the effects of wind, current, and tide, should not exceed 5 percent of the speed of the vessel, or 0.5 knot, whichever is greater.

(1566) (3) Errors in the indicated distance run, when the vessel is operating free from shallow water effect, and from the effects of wind, current, and tide, should not exceed 5 percent of the distance run of the vessel in one hour or 0.5 nautical mile in each hour, whichever is greater.

(1567) **§164.41 Electronic position fixing devices.**

(1568) (a) Each vessel calling at a port in the continental United States, including Alaska south of Cape Prince of Wales, except each vessel owned or bareboat chartered and operated by the United States, or by a state or its political subdivision, or by a foreign nation, and not engaged in commerce, must have one of the following:

(1569) (1) A Type I or II LORAN C receiver as defined in Section 1.2(e), meeting Part 2 (Minimum Performance Standards) of the Radio Technical Commission for Marine Services (RTCM) Paper 12-78/D0-100 dated December 20, 1977, entitled "Minimum Performance Standards) (MPS) Marine Loran-C Receiving Equipment." Each receiver installed must be labeled with the information required under paragraph (b) of this section.

(1570) (2) A satellite navigation receiver with:

(1571) (i) Automatic acquisition of satellite signals after initial operator settings have been entered; and

(1572) (ii) Position updates derived from satellite information during each usable satellite pass.

(1573) (3) A system that is found by the Commandant to meet the intent of the statements of availability, coverage, and accuracy for the U.S. Coastal Confluence Zone (CCZ) contained in the U.S. "Federal Radionavigation Plan" (Report No. DOD-NO 4650.4–P, I or No. DOT-TSC-RSPA-80-16, I). A person desiring a finding by the Commandant under this subparagraph must submit a written application describing the device to the Assistant Commandant for Operations, 2100 Second Street, SW, Washington, DC 20593-0001. After reviewing the application, the Commandant may request additional information to establish whether or not the device meets the intent of the Federal Radionavigation Plan.

(1574) **Note.**–The Federal Radionavigation Plan is available from the National Technical Information Service, Springfield, Va. 22161, with the following Government Accession Numbers:

(1575) Vol 1, ADA 116468

(1576) Vol 2, ADA 116469

(1577) Vol 3, ADA 116470

(1578) Vol 4, ADA 116471

(1579) (b) Each label required under paragraph (a)(1) of this section must show the following:

(1580) (1) The name and address of the manufacturer.

(1581) (2) The following statement by the manufacturer:

(1582) This receiver was designed and manufactured to meet Part 2 (Minimum Performance Standards) of the RTCM MPS for Marine Loran-C Receiving Equipment.

(1583) **§164.42 Rate of turn indicator.**

(1584) Each vessel of 100,000 gross tons or more constructed on or after September 1, 1984, shall be fitted with a rate of turn indicator.

(1585) **§164.43 Automatic Identification System Shipborne Equipment.**

(1586) (a) Each vessel required to provide automated position reports to a Vessel Traffic Service (VTS) must do so by an installed Automatic Identification System Shipborne Equipment (AISSE) system consisting of a:

(1587) (1) Twelve-channel all-in-view Differential Global Positioning System (dGPS) receiver;

(1588) (2) Marine band Non-Directional Beacon receiver capable of receiving dGPS error correction messages;

(1589) (3) VHF-FM transceiver capable of Digital Selective Calling (DSC) on the designated DSC frequency; and

(1590) (4) Control unit.

(1591) (b) An AISSE must have the following capabilities:

(1592) (1) Use dGPS to sense the position of the vessel and determine the time of the position using Universal Coordinated Time (UTC);

(1593) (2) Fully use the broadcast type 1, 2, 3, 5, 6, 7, 9, and 16 messages, as specified in RTCM Recommended Standards for Differential NAVSTAR GPS Service in determining the required information;

(1594) (3) Achieve a position error which is less than ten meters (32.8 feet) 2 distance root mean square (2 drms) from the true North American Datum of 1983 (NAD 83) in the position information transmitted to a VTS;

(1595) (4) Achieve a course error of less than 0.5 degrees from true course over ground in the course information transmitted to a VTS;

(1596) (5) Achieve a speed error of less than 0.05 knots from true speed over ground in the speed information transmitted to a VTS;

(1597) (6) Receive and comply with commands broadcast from a VTS as DSC messages on the designated DSC frequency;

(1598) (7) Receive and comply with RTCM messages broadcast as minimum shift keying modulated medium frequency signals in the marine radiobeacon band, and supply the messages to the dGPS receiver;

(1599) (8) Transmit the vessel's position, tagged with the UTC position solution, course over ground, speed over ground, and Lloyd's identification number to a VTS;

(1600) (9) Display a visual alarm to indicate to shipboard personnel when a failure to receive or utilize the RTCM messages occurs;

(1601) (10) Display a separate visual alarm which is triggered by a VTS utilizing a DSC message to indicate to shipboard personnel that the U.S. Coast Guard dGPS system cannot provide the required error correction messages; and

(1602) (11) Display two RTCM type 16 messages, one of which must display the position error in the position error broadcast.

(1603) (c) An AISSE is considered non-operational if it fails to meet the requirements of paragraph (b) of this section.

(1604) **Note:** Vessel Traffic Service (VTS) areas and operating procedures are set forth in Part 161 of this chapter.

(1605) **§164.51 Deviations from rules: Emergency.**

(1606) Except for the requirements of §164.53(b), in an emergency, any person may deviate from any rule in this part to the extent necessary to avoid endangering persons, property, or the environment.

(1607) **§164.53 Deviations from rules and reporting: Non-operating equipment.**

(1608) (a) If during a voyage any equipment required by this part stops operating properly, the person directing the movement of the vessel may continue to the next port of call, subject to the directions of the District Commander or the Captain of the Port, as provided by 33 CFR 160.

(1609) (b) If the vessel's radar, radio navigation receivers, gyrocompass, echo depth sounding device, or primary steering gear stops operating properly, the person directing the movement of the vessel must report or cause to be reported that it is not operating properly to the nearest Captain of the Port, District Commander, or, if participating in a Vessel Traffic Service, to the Vessel Traffic Center, as soon as possible.

(1610) **§164.55 Deviations from rules: Continuing operation or period of time.**

(1611) The Captain of the Port, upon written application, may authorize a deviation from any rule in this part if he determines that the deviation does not impair the safe navigation of the vessel under anticipated conditions and will not result in a violation of the rules for preventing collisions at sea. The authorization may be issued for vessels operating in the waters under the jurisdiction of the Captain of the Port for any continuing operation or period of time the Captain of the Port specifies.

(1612) **§164.61 Marine casualty reporting and record retention.**

(1613) When a vessel is involved in a marine casualty as defined in 46 CFR 4.03-1, the master or person in charge of the vessel shall–

(1614) (a) Ensure compliance with 46 CFR 4.05, "Notice of Marine Casualty and Voyage Records," and

(1615) (b) Ensure that the voyage records required by 46 CFR 4.05-15 are retained for–

(1616) (1) 30 days after the casualty if the vessel remains in the navigable waters of the United States; or

(1617) (2) 30 days after the return of the vessel to a United States port if the vessel departs the navigable waters of the United States within 30 days after the marine casualty.

(1618) **§164.70 Definitions.**

(1619) For purposes of §§164.72 through 164.82, the term–

(1620) *Current edition* means the most recent published version of a publication, chart, or map required by §164.72.

(1621) *Currently corrected edition* means a current or previous edition of a publication required by §164.72, corrected with changes that come from Notice to Mariners (NTMs) or Notices to Navigation reasonably available and that apply to the vessel's transit. Hand-annotated river maps from U.S. Army Corps of Engineers (ACOE) are currently corrected editions if issued within the previous 5 years.

(1622) *Great Lakes* means the Great Lakes and their connecting and tributary waters including the Calumet River as far as the Thomas J. O'Brien Lock and Controlling Works (between miles 326 and 327), the Chicago River as far as the east side of the Ashland Avenue Bridge (between miles 321 and 322), and the Saint Lawrence River as far east as the lower exit of Saint Lambert Lock.

(1623) *Swing-meter* means an electronic or electric device that indicates that rate of turn of the vessel on board which it is installed.

(1624) *Towing vessel* means a commercial vessel engaged in or intending to engage in pulling, pushing or hauling alongside, or any combination of pulling, pushing, or hauling alongside.

(1625) *Western Rivers* means the Mississippi River, its tributaries, South Pass, and Southwest Pass, to the navigational-demarcation lines dividing the high seas from harbors, rivers, and other inland waters of the United States, and the Port Allen-Morgan City Alternative Route, and that part of the Atchafalaya River above its junction with the Port Allen-Morgan City Alternative Route including the Old River and the Red River and those waters specified by §§89.25 and 89.27 of this chapter, and such other, similar waters as are designated by the COTP.

(1626) **§164.72 Navigational-safety equipment, charts or maps, and publications required on towing vessels.**

(1627) (a) Except as provided by §164.01(b), each towing vessel must be equipped with thefollowing navigational-safety equipment:

(1628) (1) *Marine Radar.* By August 2, 1997, a marine radar that meets the following applicable requirements:

(1629) (i) For a vessel of less than 300 tons gross tonnage that engages in towing on navigable waters of the U.S., including Western Rivers, the radar must meet–

(1630) (A) The requirements of the Federal Communications Commission (FCC) specified by 47 CFR part 80; and

(1631) (B) RTCM Standard for Marine Radar Equipment Installed on Ships of Less Than 300 Tons Gross Tonnage, RTCM Paper-71-95/SC112-STD, Version 1.1, display Category II and stabilization Category Bravo.

(1632) (ii) For a vessel of less than 300 tons gross tonnage that engages in towing seaward of navigable waters of the U.S. or more than three nautical miles from shore on the Great Lakes, the radar must meet–

(1633) (A) The requirements of the FCC specified by 47 CFR part 80; and

(1634) (B) RTCM Standard for Marine Radar Equipment Installed on Ships of Less Than 300 Tons Gross Tonnage, RTCM Paper 71-95/SC112-STD, Version 1.1, display Category I and stabilization Category Alpha.

(1635) (iii) For a vessel of 300 tons gross tonnage or more that engages in towing on navigable waters of the U.S., including Western rivers, the radar must meet–

(1636) (A) The requirements of the Federal Communications Commission (FCC) specified by 47 CFR part 80; and

(1637) (B) RTCM Recommended Standards for Marine Radar Equipment Installed on Ships of 300 Tons Gross Tonnage and Upwards, RTCM Paper 191-93/SC112-X, Version 1.2 except the requirements for azimuth stabilization in paragraph 3.10.

(1638) (iv) For a vessel of 300 tons gross tonnage or more that engages in towing seaward of navigable waters of the U.S. or more than three nautical miles from shore on the Great Lakes, the radar must meet–

(1639) (A) The requirements of the FCC specified by 47 CFR part 80; and

(1640) (B) RTCM Recommended Standards for Marine Radar Equipment Installed on Ships of 300 Tons Gross Tonnage and Upwards, RTCM Paper 191-93/SC112-X, Version 1.2.

(1641) (v) A towing vessel with an existing radar must meet the applicable requirements of paragraphs (a)(1)(i) through (iv) of this section by August 2, 1998; except that a towing vessel with an existing radar must meet the display and stabilization requirements of paragraph (a)(1)(ii)(B) of this section by August 2, 2001.

(1642) (2) *Searchlight.* A searchlight, directable from the vessel's main steering station and capable of illuminating objects at a distance of at least two times the length of the tow.

(1643) (3) *VHF-FM Radio.* An installation or multiple installations of VHF-FM radios as prescribed by part 26 of this chapter and 47 CFR part 80, to maintain a continuous listening watch on the designated calling channel, VHF-FM Channel 13 (except on portions of the Lower Mississippi River, where VHF-FM Channel 67 is the designated calling channel), and to separately monitor the International Distress and Calling Channel, VHF-FM Channel 16, except when transmitting or receiving traffic on other VHF-FM channels or when participating in a Vessel Traffic Service (VTS) or monitoring a channel of a VTS. (Each U.S. towing vessel of 26 feet (about 8 meters) or more in length, except a public vessel, must hold a ship-radio-station license for radio transmitters (including radar and EPIRBs), and each operator must hold a restricted operator's license or higher. To get an application for either license, call (800) 418-FORM or (202) 418-FORM, or write to the FCC; Wireless Bureau, Licensing Division; 1270 Fairfield Road; Gettysburg, PA 17325-7245.)

(1644) (4) *Magnetic Compass.* Either–

(1645) (i) An illuminated swing-meter or an illuminated car-type magnetic steering compass readable from the vessel's main steering station, if the vessel engages in towing exclusively on Western Rivers; or

(1646) (ii) An illuminated card-type magnetic steering compass readable from the vessel's main steering station.

(1647) (5) *Echo Depth-Sounding Device.* By August 2, 2001, an echo depth-sounding device readable from the vessel's main steering station, unless the vessel engages in towing exclusively on Western Rivers.

(1648) (6) *Electronic Position-Fixing Device.* An electronic position-fixing device, either a LORAN-C receiver or a satellite navigational system such as the Global Positioning System (GPS) as required by §164.41, if the vessel engages in towing seaward of navigable waters of the U.S. or more than three nautical miles from shore on the Great Lakes.

(1649) (b) Each towing vessel must carry on board and maintain the following:

(1650) (1) *Charts or maps.* Marine charts or maps of the areas to be transited, published by the National Ocean Service (NOS), the ACOE, or a river authority that satisfy the following requirements.

(1651) (i) The charts or maps must be of a large enough scale and have enough detail to make safe navigation of the areas possible.

(1652) (ii) The charts or maps must be either–

(1653) (A) Current editions or currently corrected editions, if the vessel engages in towing exclusively on navigable waters of the U.S., including Western Rivers; or

(1654) (B) Currently corrected editions, if the vessel engages in towing seaward of navigable waters of the U.S. or more than three nautical miles from shore on the Great Lakes.

(1655) (iii) The charts or maps may be, instead of charts or maps required by paragraphs (b)(1) (i) and (ii) of this section, currently corrected marine charts or maps, or applicable extracts, published by a foreign government. These charts or maps, or applicable extracts, must contain information similar to that on the charts or maps required by paragraphs (b)(1) (i) and (ii) of the section, be of large enough scale, and have enough detail to make safe navigation of the areas possible, and must be currently corrected.

(1656) (2) *General publications.* A currently corrected edition of, or an applicable currently corrected extract from, each of the following publications for the area to be transited:

(1657) (i) If the vessel is engaged in towing exclusively on Western Rivers–

(1658) (A) U.S. Coast Guard Light List;

(1659) (B) Applicable Notices to Navigation published by the ACOE, or Local Notices to Marines (LNMs) published by the Coast Guard, for the area to be transited, when available; and

(1660) (C) River-current tables published by the ACOE or a river authority, if available.

(1661) (ii) if the vessel is engaged other than in towing exclusively on Western Rivers–

(1662) (A) Coast Guard Light List;

(1663) (B) Notices to Mariners published by the National Imagery and Mapping Agency, or LNMs published by the Coast Guard;

(1664) (C) Tidal-Current tables published by the NOS, or river-current tables published by the ACOE or a river authority:

(1665) (D) Tide tables published by the NOS; and

(1666) (E) U.S. Coast Pilot.

(1667) (c) Table 164.72, following, summarizes the navigational-safety equipment, charts or maps, and publications required for towing vessels of 12 meters or more in length engaged in towing:

(1668) **§164.74 Towline and terminal gear for towing astern.**

(1669) (a) *Towline*. The owner, master, or operator of each vessel towing astern shall ensure that the strength of each towline is adequate for its intended service, considering at least the following factors:

(1670) (1) The size and material of each towline must be–

## TABLE 164.72.—EQUIPMENT, CHARTS OR MAPS, AND PUBLICATIONS OF TOWING VESSELS OF 12 METERS OR MORE IN LENGTH

| | Western rivers | U.S. navigable waters and other than Western rivers | Waters seaward of navigable waters and 3 NM or more from shore on the Great Lakes |
|---|---|---|---|
| Marine Radar: | | | |
| Towing vessels of less than 300 GT. | RTCM Paper 71–95/SC112–STD Version 1.1, Display Category II[1] Stabilization Category BRAVO. | RTCM Paper 71–95/SC112–STD Version 1.1, Display Category II[1] Stabilization Category BRAVO. | RTCM Paper 71–95/SC112–STD Version 1.1, Display Category 1[2] Stabilization Category ALPHA. |
| Towing vessels of 300 GT or more. | RTCM Paper 191–93/SC112–X Version 1.2 (except the Azimuth stabilization requirement in paragraph 3.10).[1] | RTCM Paper 191–93/SC112–X Version 1.2 (except the Azimuth stabilization requirement in paragraph 3.10).[1] | RTCM Paper 191–93/SC112–X Version 1.2.[1] |
| Searchlight | X | X | X |
| VHF-FM radio | X | X | X |
| Magnetic compass. | X[3] | X | X |
| Swing-meter | X[3] | | |
| Echo depth-sounding device. | | X | X |
| Electronic position-fixing device. | | | X |
| Charts or maps | (1) Large enough scale. | (1) Large enough scale. | (1) Large enough scale. |
| | (2) Current edition or currently corrected edition. | (2) Current edition or currently corrected edition. | (2) Currently corrected edition. |
| General publications. | (1) U.S. Coast Guard Light List | (1) U.S. Coast Guard Light List | (1) U.S. Coast Guard Light List. |
| | (2) Notices to Navigation or Local Notice to Mariners. | (2) Local Notice to Mariners | (2) Local Notice to Mariners. |
| | (3) River-current Tables | (3) Tidal-current Tables | (3) Tidal-current Tables. |
| | | (4) Tide Tables | (4) Tide Tables. |
| | | (5) U.S. Coast Pilot | (5) U.S. Coast Pilot. |

Notes:

[1]Towing vessels with existing radar must meet this requirement by August 2, 1998.

[2]Towing vessels with existing radar must meet this requirement by August 2, 1998, but do not need to meet the display and stabilization requirement until August 2, 2001.

[3]A towing vessel may carry either a swing-meter or a magnetic compass.

(1671) (i) Appropriate for the horsepower or bollard pull of the vessel;

(1672) (ii) Appropriate for the static loads and dynamic loads expected during the intended service;

(1673) (iii) Appropriate for the sea conditions expected during the intended service;

(1674) (iv) Appropriate for exposure to the marine environment and to any chemicals used or carried on board the vessel;

(1675) (v) Appropriate for the temperatures of normal stowage and service on board the vessel;

(1676) (vi) Compatible with associated navigational-safety equipment; and

(1677) (vii) Appropriate for the likelihood of mechanical damage.

(1678) (2) Each towline as rigged must be–

(1679) (i) Free of knots;

(1680) (ii) Spliced with a thimble, or have a poured socket at its end; and

(1681) (iii) Free of wire clips except for temporary repair, for which the towline must have a thimble and either five wire clips or as many wire clips as the manufacturer specifies for the nominal diameter and construction of the towline, whichever is more.

(1682) (3) The condition of each towline must be monitored through the–

(1683) (i) Keeping on board the towing vessel or in company files of a record of the towline's initial minimum breaking strength as determined by the manufacturer, by a classification ("class") society authorized in §157.04 of this chapter, or by a tensile test that meets API Specifications 9A, Specification for Wire Rope, Section 3; ASTM D4268-93, Standard Test Method for Testing Fiber Ropes; or Cordage Institute CIA 3, Standard Test Methods for Fiber Rope Including Standard Terminations;

(1684) (ii) If the towline is purchased from another owner, master, or operator of a vessel with the intent to use it as a towline or if it is retested for any reason, keeping on board the towing vessel or in company files of a record of each retest of the towline's minimum breaking strength as determined by a class society authorized in §157.04 of this chapter or by a tensile test that meets API Specification 9A, Section 3; ASTM D4268-93; or Cordage Institute CIA 3, Standard Test Methods;

(1685) (iii) Conducting visual inspections of the towline in accordance with the manufacturer's recommendations, or at least monthly, and whenever the serviceability of the towline is in doubt the inspections being conducted by the owner, master, or operator, or by a person on whom the owner, master, or operator confers the responsibility to take corrective measures appropriate for the use of the towline);

(1686) (iv) Evaluating the serviceability of the whole towline or any part of the towline, and removing the whole or part from service either as recommended by the manufacturer or a class society authorized in §157.04 of this chapter or in accordance with a replacement schedule developed by the owner, master, or operator that accounts for at least the–

(1687) (A) Nautical miles on, or time in service of, the towline;

(1688) (B) Operating conditions experienced by the towline;

(1689) (C) History of loading of the towline;

(1690) (D) Surface condition, including corrosion and discoloration, of the towline;

(1691) (E) Amount of visible damage to the towline;

(1692) (F) Amount of material deterioration indicated by mea-

(1693) (G) Point at which a tensile test proves the minimum breaking strength of the towline inadequate by the standards of paragraph (a)(1) of this section, if necessary; and

(1694) (v) Keeping on board the towing vessel or in company files of a record of the material condition of the towline when inspected under paragraphs (a)(3)(iii) and (iv) of this section. Once this record lapses for three months or more, except when a vessel is laid up or out of service or has not deployed its towline, the owner, master, or operator shall retest the towline or remove it from service.

(1695) (b) *Terminal gear.* The owner, master, or operator of each vessel towing astern shall ensure that the gear used to control, protect, and connect each towline meets the following criteria:

(1696) (1) The material and size of the terminal gear are appropriate for the strength and anticipated loading of the towline and for the environment;

(1697) (2) Each connection is secured by at least one nut with at least one cotter pin or other means of preventing its failure;

(1698) (3) The lead of the towline is appropriate to prevent sharp bends in the towline from fairlead blocks, chocks, or tackle;

(1699) (4) There is provided a method, whether mechanical or non-mechanical, that does not endanger operating personnel but that easily releases the towline;

(1700) (5) The towline is protected from abrasion or chafing by chafing gear, lagging, or other means;

(1701) (6) Except on board a vessel towing in ice on Western Rivers or one using a towline of synthetic or natural fiber, there is fitted a winch that evenly spools and tightly winds the towline; and

(1702) (7) If a winch is fitted, there is attached to the main drum a brake that has holding power appropriate for the horsepower or bollard pull of the vessel and can be operated without power to the winch.

(1703) **§164.76 Towline and terminal gear for towing alongside and pushing ahead.**

(1704) The owner, master, or operator of each vessel towing alongside or pushing ahead shall ensure the face wires, spring lines, and push gear used–

(1705) (a) Are appropriate for the vessel's horsepower;

(1706) (b) Are appropriate for the arrangement of the tow;

(1707) (c) Are frequently inspected; and

(1708) (d) Remain serviceable.

(1709) **§164.78 Navigation under way: Towing vessels.**

(1710) (a) The owner, master, or operator of each vessel towing shall ensure that each person directing and controlling the movement of the vessel–

(1711) (1) Understands the arrangement of the tow and the effects of maneuvering on the vessel towing and on the vessel, barge, or object being towed;

(1712) (2) Can fix the position of the vessel using installed navigational equipment, aids to navigation, geographic reference-points, and hydrographic contours;

(1713) (3) Does not fix the position of the vessel using buoys alone (Buoys are aids to navigation placed in approximate positions either to alert mariners to hazards to navigation or to indicate the orientation of a channel. They may not maintain exact charted positions, because strong or varying currents, heavy seas, ice and collisions with vessels can move or sink them or set them adrift. Although they may corroborate a position fixed by other means, they cannot fix a position; however, if no other aids are available, buoys alone may establish an estimated position.);

(1715) (5) Knows and applies the variation and deviation, where a magnetic compass is fitted and where charts or maps have enough detail to enable this type of correction;

(1716) (6) Knows the speed and direction of the current, set, drift, and tidal state for the area to be transited; and

(1717) (7) Proceeds at a speed prudent for the weather, visibility, traffic density, tow draft, possibility of wake damage, speed of the current, and local speed-limits.

(1718) (b) The owner, master, or operator of each vessel towing shall ensure that the tests and inspections required by §164.80 are conducted and that the results are entered in the log or other record carried on board.

(1719) **§164.80 Tests and inspections.**

(1720) (a) The owner, master, or operator of each towing vessel of less than 1,600 GT shall ensure that the following tests and inspections of gear occur before the vessel embarks on a voyage of more than 24 hours or when each new master or operator assumes command:

(1721) (1) *Steering-systems.* A test of the steering-gear-control system; a test of the main steering gear from the alternative power supply, if installed; a verification of the rudder-angle indicator relative to the actual position of the rudder; and a visual inspection of the steering gear and its linkage.

(1722) (2) *Navigational equipment.* A test of all installed navigational equipment.

(1723) (3) *Communications.* Operation of all internal vessel control communications and vessel-control alarms, if installed.

(1724) (4) *Lights.* Operation of all navigational lights and all searchlights.

(1725) (5) *Terminal gear.* Visual inspection of tackle; of connections of bridle and towing pendant, if applicable; of chafing gear; and the winch brake, if installed.

(1726) (6) *Propulsion systems.* Visual inspection of the spaces for main propulsion machinery, of machinery, and of devices for monitoring machinery.

(1727) (b) The owner, master, or operator of each towing vessel of 1,600 GT or more shall ensure that the following tests of equipment occur at the frequency required by §164.25 and that the following inspections of gear occur before the vessel embarks on a voyage of more than 24 hours or when each new master or operator assumes command:

(1728) (1) *Navigational equipment.* Tests of onboard equipment as required by §164.25.

(1729) (2) *Terminal gear.* Visual inspection of tackle; of connections of bridle and towing pendant, if applicable; of chafing gear; and of the winch brake, if installed.

(1730) **§164.82 Maintenance, failure, and reporting.**

(1731) (a) *Maintenance.* The owner, master, or operator or each towing vessel shall maintain operative the navigational-safety equipment required by §164.72.

(1732) (b) *Failure.* If any of the navigational-safety equipment required by §164.72 fails during a voyage, the owner, master, or operator of the towing vessel shall exercise due diligence to repair it at the earliest practicable time. He or she shall enter its failure in the log or other record carried on board. The failure of equipment, in itself, does not constitute a violation of this rule; nor does it constitute unseaworthiness; nor does it obligate an owner, master, or operator to moor or anchor the vessel. However, the owner, master, or operator shall consider the state of the equipment-along with such factors as weather, visibility, traffic, and the dictates of good seamanship-in deciding whether it is safe for the vessel to proceed.

(1733) (c) *Reporting.* The owner, master, or operator of each towing vessel whose equipment is inoperative or otherwise impaired while the vessel is operating within a Vessel Traffic Service (VTS) Area shall report the fact as required by 33 CFR 161.124. (33 CFR 161.124 requires that each user of a VTS report to the Vessel Traffic Center as soon as practicable:

(1734) (1) Any absence or malfunction of vessel-operating equipment for navigational safety, such as propulsion machinery, steering gear, radar, gyrocompass, echo depth-sounding or other sounding device, automatic dependent surveillance equipment, or navigational lighting;

(1735) (2) Any condition on board the vessel likely to impair navigation, such as shortage of personnel or lack of current nautical charts or maps, or publications; and

(1736) (3) Any characteristics of the vessel that affect or restrict the maneuverability of the vessel, such as arrangement of cargo, trim, loaded condition, under-keel clearance, and speed.)

(1737) (d) *Deviation and authorization.* The owner, master, or operator of each towing vessel unable to repair within 96 hours an inoperative marine radar required by §164.72(a) shall so notify the Captain of the Port (COTP) and shall seek from the COTP both a deviation from the requirements of this section and an authorization for continued operation in the area to be transited. Failure of redundant navigational-safety equipment, including but not limited to failure of one of two installed radars, where each satisfies §164.72(a), does not necessitate either a deviation or an authorization.

(1738) (1) The initial notice and request for a deviation and an authorization may be spoken, but the request must also be written. The written request must explain why immediate repair is impracticable, and state when and by whom the repair will be made.

(1739) (2) The COTP, upon receiving even a spoken request, may grant a deviation and an authorization from any of the provisions of §§164.70 through 164.82 for a specified time if he or she decides that they would not impair the safe navigation of the vessel under anticipated conditions.

## Part 165–Regulated Navigation Areas and Limited Access Areas

### Subpart A–General

(1740) **§165.1 Purpose of part.**

(1741) The purpose of this part is to–

(1742) (a) Prescribe procedures for establishing different types of limited or controlled access areas and regulated navigation areas;

(1743) (b) Prescribe general regulations for different types of limited or controlled access areas and regulated navigation areas;

(1744) (c) Prescribe specific requirements for established areas and

(1745) (d) List specific areas and their boundaries.

(1746) **§165.5 Establishment procedures.**

(1747) (a) A safety zone, security zone, or regulated navigation area may be established on the initiative of any authorized Coast Guard official.

(1748) (b) Any person may request that a safety zone, security zone, or regulated navigation area be established. Except as provided in paragraph (c) of this section, each request must be submitted in writing to either the Captain of the Port or District Commander having jurisdiction over the location as described in 33 CFR 3, and include the following:

(1749) (1) The name of the person submitting the request;

(1750) (2) The location and boundaries of the safety zone, security zone, or regulated navigation area;

(1751) (3) The date, time, and duration that the safety zone, security zone, or regulated navigation area should be established;

(1752) (4) A description of the activities planned for the safety zone, security zone, or regulated navigation area;

(1753) (5) The nature of the restrictions or conditions desired; and

(1754) (6) The reason why the safety zone, security zone, or regulated navigation area is necessary.

(1755) (Requests for safety zones, security zones, and regulated navigation areas are approved by the Office of Management and Budget under control numbers 2115-0076, 2115-0219, and 2115-0087.)

(1756) (c) Safety Zones and Security Zones. If, for good cause, the request for a safety zone or security zone is made less than 5 working days before the zone is to be established, the request may be made orally, but it must be followed by a written request within 24 hours.

(1757) **§165.7 Notification.**

(1758) (a) The establishment of these limited access areas and regulated navigation areas is considered rulemaking. The procedures used to notify persons of the establishment of these areas vary depending upon the circumstances and emergency conditions. Notification may be made by marine broadcasts, local notice to mariners, local news media, distribution in leaflet form, and on-scene oral notice, as well as publication in the Federal Register.

(1759) (b) Notification normally contains the physical boundaries of the area, the reasons for the rule, its estimated duration, and the method of obtaining authorization to enter the area, if applicable, and special navigational rules, if applicable.

(1760) (c) Notification of the termination of the rule is usually made in the same form as the notification of its establishment.

(1761) **§165.8 Geographic coordinates.**

(1762) Geographic coordinates expressed in terms of latitude or longitude, or both, are not intended for plotting on maps or charts whose referenced horizontal datum is the North American Datum of 1983 (NAD 83), unless such geographic coordinates are expressly labeled NAD 83. Geographic coordinates without the NAD 83 reference may be plotted on maps or charts referenced to NAD 83 only after application of the appropriate corrections that are published on the particular map or chart being used.

**Subpart B–Regulated Navigation Areas**

(1763) **§165.10 Regulated navigation area.**

(1764) A regulated navigation area is a water area within a defined boundary for which regulations for vessels navigating within the area have been established under this part.

(1765) **§165.11 Vessel operating requirements (regulations).**

(1766) Each District Commander may control vessel traffic in an area which is determined to have hazardous conditions, by issuing regulations -

(1767) (a) Specifying times of vessel entry, movement, or departure to, from, within, or through ports, harbors, or other waters;

(1768) (b) Establishing vessel size, speed, draft limitations, and operating conditions; and

(1769) (c) Restricting vessel operation, in a hazardous area or under hazardous conditions, to vessels which have particular operating characteristics or capabilities which are considered necessary for safe operation under the circumstances.

(1770) **§165.13 General regulations.**

(1771) (a) The master of a vessel in a regulated navigation area shall operate the vessel in accordance with the regulations contained in Subpart F.

(1772) (b) No person may cause or authorize the operation of a vessel in a regulated navigation area contrary to the regulations in this Part.

**Subpart C–Safety Zones**

(1773) **§165.20 Safety zones.**

(1774) A Safety Zone is a water area, shore area, or water and shore area to which, for safety or environmental purposes, access is limited to authorized persons, vehicles, or vessels. It may be stationary and described by fixed limits or it may be described as a zone around a vessel in motion.

(1775) **§165.23 General regulations.**

(1776) Unless otherwise provided in this part–

(1777) (a) No person may enter a safety zone unless authorized by the COTP or the District Commander;

(1778) (b) No person may bring or cause to be brought into a safety zone any vehicle, vessel, or object unless authorized by the COTP or the District Commander;

(1779) (c) No person may remain in a safety zone or allow any vehicle, vessel, or object to remain in a safety zone unless authorized by the COTP or the District Commander; and

(1780) (d) Each person in a safety zone who has notice of a lawful order or direction shall obey the order or direction of the COTP or District Commander issued to carry out the purposes of this subpart.

**Subpart D–Security Zones**

(1781) **§165.30 Security zones.**

(1782) (a) A security zone is an area of land, water, or land and water which is so designated by the Captain of the Port or District Commander for such time as is necessary to prevent damage or injury to any vessel or waterfront facility, to safeguard ports, harbors, territories, or waters of the United States or to secure the observance of the rights and obligations of the United States.

(1783) (b) The purpose of a security zone is to safeguard from destruction, loss, or injury from sabotage or other subversive acts, accidents, or other causes of a similar nature–

(1784) (1) Vessels,

(1785) (2) Harbors,

(1786) (3) Ports and

(1787) (4) Waterfront facilities in the United States and all territory and water, continental or insular, that is subject to the jurisdiction of the United States.

(1788) **§165.33 General regulations.**

(1789) Unless otherwise provided in the special regulations in Subpart F of this part–

(1790) (a) No person or vessel may enter or remain in a security zone without the permission of the Captain of the Port;

(1791) (b) Each person and vessel in a security zone shall obey any direction or order of the Captain of the Port;

(1792) (c) The Captain of the Port may take possession and control of any vessel in the security zone;

(1793) (d) The Captain of the Port may remove any person, vessel, article, or thing from a security zone;

(1794) (e) No person may board, or take or place any article or thing on board, any vessel in a security zone without the permission of the Captain of the Port; and

(1795) (f) No person may take or place any article or thing upon any waterfront facility in a security zone without the permission of the Captain of the Port.

**Subpart E–Restricted Waterfront Areas**

(1796) **§165.40 Restricted Waterfront Areas.**

(1797) The Commandant, may direct the COTP to prevent access to waterfront facilities, and port and harbor areas, including vessels and harbor craft therein. This section may apply to persons who do not possess the credentials outlined in 33 CFR 125.09 when certain shipping activities are conducted that are outlined in 33 CFR 125.15.

**Subpart F–Specific Regulated Navigation Areas and Limited Access Areas**

(1798) **§165.901 Great Lakes-regulated navigation areas.**

(1799) (a) Lake Huron. The following are regulated navigation areas

(1800) (1) The waters of Lake Huron known as South Channel between Bois Blanc Island and Cheboygan, Michigan; bounded by a line north from Cheboygan Crib Light (LL-1340) at

(1801) 45°39′48″N., 84°27′36″W.; to Bois Blanc Island at

(1802) 45°43′42″N., 84°27′36″W.; and a line north from the mainland at

(1803) 45°43′00″N., 84°35′30″W.; to the western tangent of Bois Blanc Island at

(1804) 45°48′42″N., 84°35′30″W.

(1805) (2) The waters of Lake Huron between Mackinac Island and St. Ignace, Michigan, bounded by a line east from position

(1806) 45°52′12″N., 84°43′00″W.; to Mackinac Island at

(1807) 45°52′12″N., 84°39′00″W.; and a line east from the mainland at

(1808) 45°53′12″N., 84°43′30″W.; to the northern tangent of Mackinac Island at

(1809) 45°53′12″N., 84°38′48″W.

(1810) (b) Lake Michigan. The following is a regulated navigation area–The waters of Lake Michigan known as Gray's Reef Passage bounded by a line from Gray's Reef Light (LL-2006) at

(1811) 45°46′00″N., 85°09′12″W.; to White Shoals Light (LL-2003) at

(1812) 45°50′30″N., 85°08′06″W.; to a point at

(1813) 45°49′12″N., 85°04′48″W.; then to a point at

(1814) 45°45′42″N., 85°08′42″W.; then to the point of beginning.

(1815) (c) Regulations. The COTP, Sault Ste. Marie, will close and open these regulated navigation areas as ice conditions dictate. Under normal seasonal conditions, only one closing each winter and one opening each spring are anticipated. Prior to the closing or opening of the regulated navigation areas, the COTP will give interested parties, including both shipping interests and island residents, not less than 72 hours notice of the action. No vessel may navigate in a regulated navigation area which has been closed by the COTP. Under emergency conditions, the COTP may authorize specific vessels to navigate in a closed regulated navigation area.

(1816) **§165.902 Niagara River at Niagara Falls, New York-safety zone.**

(1817) (a) The following is a Safety Zone-The United States waters of the Niagara River from the crest of the American and Horseshoe Falls, Niagara Falls, New York to a line drawn across the Niagara River from the downstream side of the mouth of Gill Creek to the upstream end of the breakwater at the mouth of the Welland River.

(1818) **§165.903 Safety zones: Cuyahoga River and Old River, Cleveland Ohio.**

(1819) (a) *Location.* The waters of the Cuyahoga River and the Old River extending ten feet into the river at the following eleven locations, including the adjacent shorelines, are safety zones, coordinates for which are based on NAD 83.

(1820) (1) From the point where the shoreline intersects longitude 81°42′24.5″W., which is the southern side of the Conrail No. 1 railroad bridge, southeasterly along the shore for six hundred (600) feet to the point where the shoreline intersects longitude 81°42′24.5″W., which is the end of the lot adjacent to Fagan's Restaurant.

(1821) (2) One hundred (100) feet downriver to one hundred (100) feet upriver from 41°29′53.5″N., 81°42′33.5″W., which is the knuckle on the north side of the Old River entrance at Ontario Stone.

(1822) (3) Fifty (50) feet downriver to fifty (50) feet upriver from 41°29′48.4″N., 81°42′44″W., which is the knuckle adjacent to the Ontario Stone warehouse on the south side of the Old River.

(1823) (4) From 41°29′51.1″N., 81°42′32.0″W., which is the corner of Nicky's pier at Sycamore Slip on the Old River, to fifty (50) feet east of 41°29′55.1″N., 81°42′27.6″W., which is the north point of the pier at Shooter's Restaurant on the Cuyahoga River.

(1824) (5) Twenty-five (25) feet downriver to twenty-five (25) feet upriver of 41°29′48.9″N., 81°42′10.7″W., which is the knuckle toward the downriver corner of the Nautica Stage.

(1825) (6) Ten (10) feet downriver to ten (10) feet upriver of 41°29′45.5″N., 81°42′9.7″W., which is the knuckle toward the upriver corner of the Nautica Stage.

(1826) (7) The fender on the west bank of the river at 41°29′45.2″N., 81°42′10″W., which is the knuckle at Bascule Bridge (railroad).

(1827) (8) The two hundred seventy (270) foot section on the east bank of the river between the Columbus Road bridge (41°29′18.8″N., 81°42′02.3″W.) downriver to the chain link fence at the upriver end of the Commodores Club Marina.

(1828) (9) Fifty (50) feet downriver of twenty-five (25) feet upriver from 41°29′24.5″N., 81°41′57.2″W., which is the knuckle at the Upriver Marine fuel pump.

(1829) (10) Seventy-five (75) feet downriver to seventy-five (75) feet upriver from 41°29′33.7″N., 81°41′57.5″W., which is the knuckle adjacent to the warehouse at Alpha Precast Products (United Ready Mix).

(1830) (11) Fifteen (15) feet downriver to fifteen (15) feet upriver from 41°29′41″N., 81°41′38.6″W., which is the end of the chain link fence between Jim's Steak House and Shippers C & D.

(1831) (b) *Regulations*–(1) *General Rule.* Except as provided below, entry of any kind or for any purpose into the foregoing zones is strictly prohibited in accordance with the general regulations in §165.23 of this part.

(1832) (2) *Exceptions.* Any vessel may transit, but not moor, stand or anchor in, the foregoing zones as necessary to comply with the Inland Navigation Rules or to otherwise facilitate safe navigation. Cargo vessels of 1600 gross tons (GT) or greater may moor in these zones when conducting cargo transfer operations.

(1833) (3) *Waivers.* Owners or operators of docks wishing a partial waiver of these regulations may apply to the Captain of the Port, Cleveland, Ohio. Partial waivers will only be considered to allow for the mooring of vessels in a safety zone when vessels of 1600 GT on greater are not navigating in the proximate area. Any requests for a waiver must include a plan to ensure immediate removal of any vessels moored in a safety zone upon the approach of a vessel(s) 1600 GTs or greater.

(1834) **§165.904 Lake Michigan at Chicago Harbor & Burnham Park Harbor-Safety and Security Zone.**

(1835) (a) Location. All waters, waterfront facilities, and shoreline areas within 1000 yards of the shoreline surrounding Merrill

C. Meigs Airfield constitute a safety and security zone. This includes all waters including Burnham Park Harbor and the southern part of Chicago Harbor, Lake Michigan, bounded by the following coordinates:

(1836) (1) Northwest point: 41°52′33″N., 87°36′58″W.

(1837) (2) Northeast point: 41°52′33″N., 87°35′41″W.

(1838) (3) Southeast point: 41°50′42″N., 87°35′41″W.

(1839) (4) Southwest point: 41°50′42″N., 87°36′33″W.

(1840) (5) From the southwest point, north along the Lake Michigan shoreline, including Burnha Park Harbor, to the northwest point.

(1841) (b) **Effective times and dates.** This safety and security zone will be in effect at various times to be published in the Coast Guard Local Notice to Mariners or broadcasted via Marine Radio VHF-FM Channels 16 and 22. These times will include the actual effective time and date and the termination time and date.

(1842) (c) Restrictions. (1) In accordance with the general regulations in section,165.23 and 165.33 of this part, entry into this zone is prohibited, unless authorized by the U.S. Coast Guard Captain of the Port, Chicago, or the U.S. Secret Service. Other general requirements in **§§165.23 and 165.33** also apply. Further, no person may enter or remain in the shoreline areas of the established safety and security zone, unless cleared by a Coast Guard or U.S. Secret Service official.

(1843) (2) Vessels in Burnham Park Harbor at the commencement of the safety and security zone must be moored and remain moored while the safety and security zone is established, unless authorized to get underway by a Coast Guard or U.S. Secret Service official.

(1844) (3) No person may engage in swimming, snorkeling, or diving within the established safety and security zone, except with the permission of the Captain of the Port or U.S. Secret Service.

(1845) **§165.905 USX Superfund Site Safety Zones: St. Louis River.**

(1846) (a) The following areas of the St. Louis River, within the designated boxes of latitude and longitude, are safety zones:

(1847) (1) Safety Zone #1 (North Spirit Lake):

(1848) North Boundary: 46°41′33″N.

(1849) South Boundary: 46°41′18″N.

(1850) East Boundary: 92°11′53″W.

(1851) West Boundary: 92°12′11″W.

(1852) (2) Safety Zone #2 (South Spirit Lake):

(1853) North Boundary: 46°40′45″N.

(1854) South Boundary: 46°40′33″N.

(1855) East Boundary: 92°11′40″W.

(1856) West Boundary: 92°12′05″W.

(1857) (b) Transit of vessels through the waters covered by these zones is prohibited. Swimming (including water skiing or other recreational use of the water which involves a substantial risk of immersion in the water) or taking of fish (including all forms of aquatic animals) from the waters covered by these safety zones is prohibited at all times.

## Part 207–Navigation Regulations

(1858) **§207.50 Hudson River Lock at Troy, N.Y.; navigation.**

(1859) (a) Authority of lockmaster. The lockmaster shall be charged with the immediate control and management of the lock, and of the area set aside as the lock area, including the lock approach channels. He shall see that all laws, rules and regulations for the use of the lock and lock area are duly complied with, to which end he is authorized to give all necessary orders and directions in accordance therewith, both to employees of the Government and to any and every person within the limits of the lock or lock area, whether navigating the lock or not. No one shall cause any movement of any vessel, boat, or other floating thing in the lock or approaches except by or under the direction of the lockmaster or his assistants.

(1860) (b) Signals.–Steamboats or tows desiring lockage in either direction shall give notice to the locktenders, when not more than three-fourths mile from the lock, by one long blast (of 10 seconds' duration), followed by one short blast (of three seconds' duration), of a whistle or horn. When the lock is ready for entrance a green light will be shown from the river wall. An amber light will indicate that the lock is being made ready for entrance. A red light will indicate that the approaching vessel must wait. Whenever local conditions make it advisable, the visual signals will be supplemented by sound signals as follows:

(1861) (1) One long blast of a horn to indicate that the vessel must wait.

(1862) (2) One short blast of a horn to indicate that the lock is being made ready for entrance.

(1863) (3) Two short blasts of a horn to indicate permission to enter the lock.

(1864) (4) Four short and rapid blasts to attract attention, indicate caution, and signal danger.

(1865) (c) Draft of boats. Deep-draft boats must clear the miter sills by at least 3 inches. Boats drawing too much water will not be allowed to lighter cargo in the entrances.

(1866) (d) Precedence at the lock. The vessel arriving first at the lock shall be first to lock through; but precedence shall be given to vessels belonging to the United States and to commercial vessels in the order named. Arrival posts or markers may be established ashore above or below the lock. Vessels arriving at or opposite such posts or markers will be considered as having arrived at the lock within the meaning of this paragraph. If the traffic is crowded in both directions, up and down lockages will usually be made alternately, but the locktender may permit two or more lockages to be made at one time in the same direction when this will not cause unreasonable delay. In case two or more boats or tows are to enter for the same lockage, they shall enter as directed by the locktender. No boat shall run ahead of another while in the lock. The boat that enters first shall leave first.

(1867) (e) Lockage of pleasure boats. The lockage of pleasure boats, house boats or like craft shall be expedited by locking them through with commercial craft (other than barges carrying gasoline or highly hazardous materials) in order to utilize the capacity of the lock to its maximum. Lockage of pleasure craft may be made with commercial craft carrying petroleum products other than gasoline, provided a clear distance of at least 100 feet between such vessels can be maintained in the lock. If, after the arrival of such craft, no separate or combined lockage can be accomplished within a reasonable time, not to exceed the time required for three other lockages, then separate lockage shall be made.

(1868) (f) Stations while waiting. Boats waiting their turn to enter the lock must lie at a sufficient distance from the lock and in such a position as to leave sufficient room for the passage of boats leaving the lock.

(1869) (g) Unnecessary delay. (1) Boats must not cause delay in entering or leaving the lock. Masters and pilots will be held to a strict accountability in this matter, and those with tows must provide enough men to move barges promptly. Boats failing to enter the lock with reasonable promptness after being signaled will lose their turn.

(1870) (2) Tugboats arriving with their tows in a condition which will delay locking shall lose their turn if so ordered by the lock tender. Leaking boats may be excluded until put in shape to be passed through safely.

(1871) (h) Mooring. Boats in the lock or waiting in the entrance shall be moored where directed by the lock tender, by bow, stern, and spring lines, to the snubbing posts or line hooks. Tying boats to the lock ladders is strictly prohibited.

(1872) (i) Protection of lock gates. Boats will not be permitted to enter or leave the lock until the lock gates are at rest in the gate recesses and the lock tender has directed the boat to start.

(1873) (j) Damage to walls, etc. All craft passing through the lock must be free from projections or sharp corners which might scar the walls or injure other parts. Steamboats must be provided with suitable fenders, etc. One man shall be kept at the head of every tow till it has cleared the lock and guide walls, and shall use the fender to prevent scarring the walls.

(1874) (k) Handling machinery. None but employees of the United States will be allowed to move any valve, gate, or other machinery belonging to the lock.

(1875) (l) Refuse in lock. Throwing ashes, refuse, or other obstruction in the entrances or in the lock, or on the walls thereof, and passing coal from flats or barges to a steam boat while in the lock is prohibited.

(1876) (m) (Reserved)

(1877) (n) Trespass on United States property. Trespass on United States property, or willful injury to the banks, masonry, fences, trees, houses, machinery, or other property of the United States at or near the lock is strictly prohibited.

(1878) (o) Penalties.–In addition to the penalties prescribed by law, boats which fail to comply with the regulations in this section will thereafter be refused lockage until assurances have been received, satisfactory to the District Engineer, Corps of Engineers, New York, N.Y., that the regulations will be complied with.

(1879) **§207.300 Ohio River, Mississippi River above Cairo, Ill.; and their tributaries; use, administration, and navigation.**

(1880) (a) Authority of Lockmasters.–(1) Locks Staffed with Government Personnel. The provisions of this paragraph apply to all waterways in this section except for Cordell Hull Lock located at Mile 313.5 on the Cumberland River in Tennesee. The lockmaster shall be charged with the immediate control and management of the lock, and of the area set aside as the lock area, including the lock approach channels. He/she shall see that all laws, rules, and regulations for the use of the lock and lock area are duly complied with, to which end he/she is authorized to give all necessary orders and directions in accordance therewith, both to employees of the Government and to any and every person within the limits of the lock or lock area, whether navigating the lock or not. No one shall cause any movement of any vessel, boat, or other floating thing in the lock or approaches except by or under the direction of the lockmaster or his/her assistants. In the event of an emergency, the lockmaster may depart from these regulations as he deems necessary. The lockmasters shall also be charged with the control and management of federally constructed mooring facilities.

(1881) (2) Locks Staffed with Contract Personnel. The provisions of this paragraph apply to Cordell Hull Lock located at Mile 313.5 on the Cumberland River in Tennessee. Contract personnel shall give all necessary orders and directions for operations of the lock. No one shall cause any movement of any vessel, boat or other floating thing in the locks or approaches except by or under the direction of the contract lock operator. All duties and responsibilities of the lockmaster set forth in this section shall be performed by the contract lock operator except that responsibility for enforcing all laws, rules, and regulations shall be vested in a government employee designated by the Nashville District Engineer. The district engineer will notify waterway users and the general public through appropriate notices and media concerning the location and identity of the designated government employee.

(1882) (b) Safety rules for vessels using navigation locks. The following safety rules are hereby prescribed for vessels in the locking process, including the act of approaching or departing a lock:

(1883) (1) Tows with flammable or hazardous cargo barges, loaded or empty. (i) Stripping barges or transferring cargo is prohibited.

(1884) (ii) All hatches on barges used to transport flammable or hazardous materials shall be closed and latched, except those barges carrying a gas-free certificate.

(1885) (iii) Spark-proof protective rubbing fenders ("possums") shall be used.

(1886) (2) All vessels. (i) Leaking vessels may be excluded from locks until they have been repaired to the satisfaction of the lockmaster.

(1887) (ii) Smoking, open flames, and chipping or other spark-producing activities are prohibited on deck during the locking cycle.

(1888) (iii) Painting will not be permitted in the lock chamber during the locking cycle.

(1889) (iv) Tow speeds shall be reduced to a rate of travel such that the tow can be stopped by checking should mechanical difficulties develop. Pilots should check with the individual lockmasters concerning prevailing conditions. It is also recommended that pilots check their ability to reverse their engines prior to beginning an approach. Engines shall not be turned off in the lock until the tow has stopped and been made fast.

(1890) (v) U.S. Coast Guard regulations require all vessels to have on board life saving devices for prevention of drowning. All crew members of vessels required to carry work vests (life jackets) shall wear them during a lockage, except those persons in an area enclosed with a handrail or other device which would reasonably preclude the possibility of falling overboard. All deckhands handling lines during locking procedure shall wear a life jacket. Vessels not required by Coast Guard regulations to have work vests aboard shall have at least the prescribed life saving devices, located for ready access and use if needed. The lockmaster may refuse lockage to any vessel which fails to conform to the above.

(1891) (c) Reporting of navigation incidents. In furtherance of increased safety on waterways the following safety rules are hereby prescribed for all navigation interests:

(1892) (1) Any incident resulting in uncontrolled barges shall immediately be reported to the nearest lock. The report shall include information as to the number of loose barges, their cargo, and the time and location where they broke loose. The lockmaster or locks shall be kept informed of the progress being made in bringing the barges under control so that he can initiate whatever actions may be warranted.

(1893) (2) Whenever barges are temporarily moored at other than commercial terminals or established fleeting areas, and their breaking away could endanger a lock, the nearest lock shall be so notified, preferably the downstream lock.

(1894) (3) Sunken or sinking barges shall be reported to the nearest lock both downstream and upstream of the location in order that other traffic passing those points may be advised of the hazards.

(1895) (4) In the event of an oil spill, notify the nearest lock downstream, specifying the time and location of the incident, type

of oil, amount of spill, and what recovery or controlling measures are being employed.

(1896) (5) Any other activity on the waterways that could conceivably endanger navigation or a navigation structure shall be reported to the nearest lock.

(1897) (6) Whenever it is necessary to report an incident involving uncontrolled, sunken or sinking barges, the cargo in the barges shall be accurately identified.

(1898) (d) Precedence at locks. (1) The vessel arriving first at a lock shall normally be first to lock through, but precedence shall be given to vessels belonging to the United States. Licensed commercial passenger vessels operating on a published schedule or regularly operating in the "for hire" trade shall have precedence over cargo tows and like craft. Commercial cargo tows shall have precedence over recreational craft, except as described in paragraph (f) of this section.

(1899) (2) Arrival posts or markers may be established ashore above and/or below the locks. Vessels arriving at or opposite such posts or markers will be considered as having arrived at the locks within the meaning of this paragraph. Precedence may be established visually or by radio communication. The lockmaster may prescribe such departure from the normal order of precedence as in his judgment is warranted to achieve best lock utilization.

(1900) (e) Unnecessary delay at locks. Masters and pilots must use every precaution to prevent unnecessary delay in entering or leaving locks. Vessels failing to enter locks with reasonable promptness when signalled to do so shall lose their turn. Rearranging or switching of barges in the locks or in approaches is prohibited unless approved or directed by the lockmaster. This is not meant to curtail "jackknifing" or set-overs where normally practiced.

(1901) (f) Lockage of recreational craft. In order to fully utilize the capacity of the lock, the lockage of recreational craft shall be expedited by locking them through with commercial craft, provided that both parties agree to joint use of the chamber. When recreational craft are locked simultaneously with commercial tows, the lockmaster will direct, whenever practicable, that the recreational craft enter the lock and depart while the tow is secured in the lock. Recreational craft will not be locked through with vessels carrying volatile cargoes or other substances likely to emit toxic or explosive vapors. If the lockage of recreation craft cannot be accomplished within the time required for three other lockages, a separate lockage of recreational craft shall be made. Recreational craft operators are advised that many locks have a pull chain located at each end of the lock which signals the lockmaster that lockage is desired. Furthermore, many Mississippi River locks utilize a strobe light at the lock to signal recreational type vessels that the lock is ready for entry. Such lights are used exclusively to signal recreational craft.

(1902) (g) Simultaneous lockage of tows with dangerous cargoes. Simultaneous lockage of other tows with tows carrying dangerous cargoes or containing flammable vapors normally will only be permitted when there is agreement between the lockmaster and both vessel masters that the simultaneous lockage can be executed safely. He shall make a separate decision each time such action seems safe and appropriate, provided:

(1903) (1) The first vessel or tow in and the last vessel or tow out are secured before the other enters or leaves.

(1904) (2) Any vessel or tow carrying dangerous cargoes is not leaking.

(1905) (3) All masters involved have agreed to the joint use of the lock chamber.

(1906) (h) Stations while awaiting a lockage. Vessels awaiting their turn to lock shall remain sufficiently clear of the structure to allow unobstructed departure for the vessel leaving the lock. However, to the extent practicable under the prevailing conditions, vessels and tows shall position themselves so as to minimize approach time when signaled to do so.

(1907) (i) Stations while awaiting access through navigable pass. When navigable dams are up or are in the process of being raised or lowered, vessels desiring to use the pass shall wait outside the limits of the approach points unless authorized otherwise by the lockmaster.

(1908) (j) Signals. Signals from vessels shall ordinarily be by whistle; signals from locks to vessels shall be by whistle, another sound device, or visual means. When a whistle is used, long blasts of the whistle shall not exceed 10 seconds and short blasts of the whistle shall not exceed 3 seconds. Where a lock is not provided with a sound or visual signal installation, the lockmaster will indicate by voice or by the wave of a hand when the vessel may enter or leave the lock. Vessels must approach the locks with caution and shall not enter nor leave the lock until signaled to do so by the lockmaster. The following lockage signals are prescribed:

(1909) (1) Sound signals by means of a whistle. These signals apply at either a single lock or twin locks.

(1910) (i) Vessels desiring lockage shall on approaching a lock give the following signals at a distance of not more than one mile from the lock;

(1911) (a) If a single lockage only is required: One long blast of the whistle followed by one short blast.

(1912) (b) If a double lockage is required: One long blast of the whistle followed by two short blasts.

(1913) (ii) When the lock is ready for entrance, the lock will give the following signals:

(1914) (a) One long blast of the whistle indicates permission to enter the lock chamber in the case of a single lock or to enter the landward chamber in the case of twin locks.

(1915) (b) Two long blasts of the whistle indicates permission to enter the riverward chamber in the case of twin locks.

(1916) (iii) Permission to leave the locks will be indicated by the following signals given by the lock:

(1917) (a) One short blast of the whistle indicates permission to leave the lock chamber in the case of a single lock or to leave the landward chamber in the case of twin locks.

(1918) (b) Two short blasts of the whistle indicates permission to leave the riverward chamber in the case of twin locks.

(1919) (iv) Four or more short blasts of the lock whistle delivered in rapid succession will be used as a means of attracting attention, to indicate caution, and to signal danger. This signal will be used to attract the attention of the captain and crews of vessels using or approaching the lock or navigating in its vicinity and to indicate that something unusual involving danger or requiring special caution is happening or is about to take place. When this signal is given by the lock, the captains and crews of vessels in the vicinity shall immediately become on the alert to determine the reason for the signal and shall take the necessary steps to cope with the situation.

(1920) (2) Lock signal lights. At locks where density of traffic or other local conditions make it advisable, the sound signals from the lock will be supplemented by signal lights. Flashing lights (showing a one-second flash followed by a two-second eclipse) will be located on or near each end of the land wall to control use of a single lock or of the landward lock of double locks. In addition, at double locks, interrupted flashing lights (showing a one-second flash, a one-second eclipse and a one-second flash, fol-

lowed by a three-second eclipse) will be located on or near each end of the intermediate wall to control use of the riverward lock. Navigation will be governed as follows:

(1921) (i) Red light. Lock cannot be made ready immediately. Vessel shall stand clear.

(1922) (ii) Amber light. Lock is being made ready. Vessel may approach but under full control.

(1923) (iii) Green light. Lock is ready for entrance.

(1924) (iv) Green and Amber. Lock is ready for entrance but gates cannot be recessed completely. Vessel may enter under full control and with extreme caution.

(1925) (3) Radio Communications. VHF-FM radios, operating in the FCC authorized Maritime Band, have been installed at all operational locks (except those on the Kentucky River and Lock 3, Green River). Radio contact may be made by any vessel desiring passage. Commercial tows are especially requested to make contact at least one half hour before arrival in order that the pilot may be informed of current river and traffic conditions that may affect the safe passage of his tow.

(1926) (4) All locks monitor 156.8 MHz (Ch. 16) and 156.65 MHz (Ch. 13) and can work 156.65 MHz (Ch. 13) and 156.7 MHz (Ch. 14) Ch. 16 is the authorized call, reply and distress frequency, and locks are not permitted to work on this frequency except in an emergency involving the risk of immediate loss of life or property. Vessels may call and work Ch. 13, without switching but are cautioned that vessel to lock traffic must not interrupt or delay Bridge to Bridge traffic which has priority at all times.

(1927) (k) Rafts. Rafts to be locked through shall be moored in such manner as not to obstruct the entrance of the lock, and if to be locked in sections, shall be brought to the lock as directed by the lockmaster. After passing the lock the sections shall be reassembled at such distance beyond the lock as not to interfere with other vessels.

(1928) (1) Entrance to and Exit from Locks. In case two or more boats or tows are to enter for the same lockage, their order of entry shall be determined by the lockmaster. Except as directed by the lockmaster, no boat shall pass another in the lock. In no case will boats be permitted to enter or leave the locks until directed to do so by the lockmaster. The sides of all craft passing through any lock shall be free from projections of any kind which might injure the lock walls. All vessels shall be provided with suitable fenders, and shall be used to protect the lock and guide walls until it has cleared the lock and guide walls.

(1929) (m) Mooring. (1) At locks. (i) All vessels when in the locks shall be moored as directed by the lockmaster. Vessels shall be moored with bow and stern lines leading in opposite directions to prevent the vessel from "running" in the lock. All vessels will have one additional line available on the head of the tow for emergency use. The pilothouse shall be attended by qualified personnel during the entire locking procedure. When the vessel is securely moored, the pilot shall not cause movement of the propellers except in emergency or unless directed by the lockmaster. Tying to lock ladders is strictly prohibited.

(1930) (ii) Mooring of unattended or nonpropelled vessels or small craft at the upper or lower channel approaches will not be permitted within 1200 feet of the lock.

(1931) (2) Outside of locks. (i) No vessel or other craft shall regularly or permanently moor in any reach of a navigation channel. The approximate centerline of such channels are marked as the sailing line on Corps of Engineers' navigation charts. Nor shall any floating craft, except in an emergency, moor in any narrow or hazardous section of the waterway. Furthermore, all vessels or other craft are prohibited from regularly or permanently mooring in any section of navigable waterways which are congested with commercial facilities or traffic unless it is moored at facilities approved by the Secretary of the Army or his authorized representative. The limits of the congested areas shall be marked on Corps of Engineers' navigation charts. However, the District Engineer may authorize in writing exceptions to any of the above if, in his judgment, such mooring would not adversely affect navigation and anchorage.

(1932) (ii) No vessel or other craft shall be moored to railroad tracks, to riverbanks in the vicinity of railroad tracks when such mooring threatens the safety of equipment using such tracks, to telephone poles or power poles, or to bridges or similar structures used by the public.

(1933) (iii) Except in case of great emergency, no vessel or craft shall anchor over revetted banks of the river, and no floating plant other than launches and similar small craft shall land against banks protected by revetment except at regular commercial landings. In all cases, every precaution to avoid damage to the revetment works shall be exercised. The construction of log rafts along mattressed or paved banks or the tying up and landing of log rafts against such banks shall be performed in such a manner as to cause no damage to the mattress work or bank paving. Generally, mattress work extends out into the river 600 feet from the low water line.

(1934) (iv) Any vessel utilizing a federally constructed mooring facility (e.g., cells, buoys, anchor rings) at the points designated on the current issue of the Corps' navigation charts shall advise the lockmaster at the nearest lock from that point by the most expeditious means.

(1935) (n) Draft of vessels. No vessel shall attempt to enter a lock unless its draft is at least three inches less than the least depth of water over the guard sills, or over the gate sills if there be no guard sills. Information concerning controlling depth over sills can be obtained from the lockmaster at each lock or by inquiry at the office of the district engineer of the district in which the lock is located.

(1936) (o) Handling machinery. No one but employees of the United States shall move any lock machinery except as directed by the lockmaster. Tampering or meddling with the machinery or other parts of the lock is strictly forbidden.

(1937) (p) Refuse in locks. Placing or discharging refuse of any description into the lock, on lock walls or esplanade, canal or canal bank is prohibited.

(1938) (q) Damage to locks or other work. To avoid damage to plant and structures connected with the construction or repair of locks and dams, vessels passing structures in the process of construction or repair shall reduce their speed and navigate with special caution while in the vicinity of such work. The restrictions and admonitions contained in these regulations shall not affect the liability of the owners and operators of floating craft for any damage to locks or other structures caused by the operation of such craft.

(1939) (r) Trespass of lock property. Trespass on locks or dams or other United States property pertaining to the locks or dams is strictly prohibited except in those areas specifically permitted. Parties committing any injury to the locks or dams or to any part thereof will be responsible therefor. Any person committing a willful injury to any United States property will be prosecuted. No fishing will be permitted from lock walls, guide walls, or guard walls of any lock or from any dam, except in areas designated and posted by the responsible District Engineer as fishing areas. Personnel from commercial and recreational craft will be allowed on

the lock structure for legitimate business reasons; e.g., crew changes, emergency phone calls, etc.

(1940) (s) Restricted areas at locks and dams. All waters immediately above and below each dam, as posted by the respective District Engineers, are hereby designated as restricted areas. No vessel or other floating craft shall enter any such restricted area at any time. The limits of the restricted areas at each dam will be determined by the responsible District Engineer and marked by signs and/or flashing red lights installed in conspicuous and appropriate places.

(1941) (t) (Reserved)

(1942) (u) Operations during high water and floods in designated vulnerable areas. Vessels operating on these waters during periods when river stages exceed the level of "ordinary high water," as designated on Corps of Engineers' navigation charts, shall exercise reasonable care to minimize the effects of their bow waves and propeller washes on river banks; submerged or partially submerged structures or habitations; terrestrial growth such as trees and bushes; and man-made amenities that may be present. Vessels shall operate carefully when passing close to levees and other flood protection works, and shall observe minimum distances from banks which may be prescribed from time to time in Notices to Navigation Interests. Pilots should exercise particular care not to direct propeller wash at river banks, levees, revetments, structures or other appurtenances subject to damage from wave action.

(1943) (v) Navigation lights for use at all locks and dams except on the Kentucky River and Lock 3, Green River. (1) At locks at all fixed dams and at locks at all movable dams when the dams are up so that there is no navigable pass through the dam, the following navigation lights will be displayed during hours of darkness:

(1944) (i) Three green lights visible through an arc of 360° arranged in a vertical line on the upstream end of the river (guard) wall unless the intermediate wall extends farther upstream. In the latter case, the lights will be placed on the upstream end of the intermediate wall.

(1945) (ii) Two green lights visible through an arc of 360° arranged in a vertical line on the downstream end of the river (guard) wall unless the intermediate wall extends farther downstream. In the latter case, the lights will be placed on the downstream end of the intermediate wall.

(1946) (iii) A single red light, visible through an arc of 360° on ·ach end (upstream and downstream) of the land (guide) wall.

(1947) (2) At movable dams when the dam has been lowered or ·artly lowered so that there is an unobstructed navigable pass ›rough the dam, the navigation lights indicated in the following aragraphs will be displayed during hours of darkness until lock ·alls and weir piers are awash.

(1948) (i) Three red lights visible through an arc of 360° rranged in a vertical line on the upstream end of the river (guard) ·all.

(1949) (ii) Two red lights visible through an arc of 360° arranged a vertical line on the downstream end of the river (guard) wall.

(1950) (iii) A single red light visible through an arc of 360° on ıch end (upstream and downstream) of the land (guide) wall.

(1951) (3) After lock walls and weir piers are awash they will be ·arked as prescribed in paragraph (x) of this section.

(1952) (4) If one or more bear traps or weirs are open or partially ›en, and may cause a set in current conditions at the upper ›proach to the locks, this fact will be indicated by displaying a hite circular disk 5 feet in diameter, on or near the light support ı the upstream end of the land (guide) wall during the hours of ·ylight, and will be indicated during hours of darkness by displaying a white (amber) light vertically under and 5 feet below the red light on the upstream end of the land (guide) wall.

(1953) (5) At Locks No. 1 and 2, Green River, when the locks are not in operation because of high river stages, a single red light visible through an arc of 360° will be displayed on each end (upstream and downstream) of the lock river (guard) will at which time the lights referred to above will not be visible.

(1954) (w) Navigation lights for use at locks and dams on the Kentucky River and Lock 3, Green River. A single red light visible through an arc of 360° shall be displayed during hours of darkness at each end of the river wall or extending guard structures until these structures are awash.

(1955) (x) Buoys at movable dams. (1) Whenever the river (guard) wall of the lock and any portion of the dam are awash, and until covered by a depth of water equal to the project depth, the limits of the navigable pass through the dam will be marked by buoys located at the upstream and downstream ends of the river (guard) wall, and by a single buoy over the end or ends of the portion or portions of the dam adjacent to the navigable pass over which project depth is not available. A red nun-type buoy will be used for such structures located on the left-hand side (facing downstream) of the river and a black can-type buoy for such structures located on the right-hand side. Buoys will be lighted, if practicable.

(1956) (2) Where powerhouses or other substantial structures projecting considerably above the level of the lock wall are located on the river (guard) wall, a single red light located on top of one of these structures may be used instead of river wall buoys prescribed above until these structures are awash, after which they will be marked by a buoy of appropriate type and color (red nun or black can buoy) until covered by a depth of water equal to the project depth. Buoys will be lighted, if practicable.

(1957) (y) Vessels to carry regulations. A copy of these regulations shall be kept at all times on board each vessel regularly engaged in navigating the rivers to which these regulations apply. Copies may be obtained from any lock office or District Engineer's office on request. Masters of such vessels are encouraged to have on board copies of the current edition of appropriate navigation charts.

(1958) **Notes**

(1959) 1. Muskingum River Lock & Dam 1 has been removed. Ohio River slackwater provides navigable channel for recreational craft to Lock 2 near Devola, Ohio. Muskingum River Locks 2 thru 11 inclusive have been transferred to the State of Ohio and are operated during the recreational boating season by the Ohio Department of Natural Resources. Inquiries regarding Muskingum River channel conditions and lock availability should be directed to the aforementioned Department.

(1960) 2. Little Kanawha River Lock and Dam 1 has been removed, thus permitting recreational craft to navigate up to Lock 2 near Slate, W. Va. Operation of Locks 2 thru 5 on the Little Kanawha River has been discontinued.

(1961) 3. Big Sandy River: Lock 1 has been removed, thus permitting recreational craft to navigate to Lock 2, near Buchanan, Ky. Operation of Lock 2 and Lock 3 near Fort Gay, W. Va. has been discontinued. Operation of Lock and Dam 1 on Levisa Fork near Gallup, Ky., and Lock and Dam 1 on Tug Fork near Chapman, Ky. has been discontinued.

(1962) 4. Operation of the following Green River Locks has been discontinued: Lock 4 near Woodbury, Ky., Lock 5 near Glenmore, Ky., and Lock 6 near Brownsville, Ky.

(1963) 5. Operation of Barren River Lock and Dam No. 1 near Richardsville, Ky. has been discontinued.

(1964) 6. Operation of Rough River Lock and Dam No. 1 near Hartford, Ky. has been discontinued.

(1965) 7. Operation of Osage River Lock and Dam 1 near Osage City, Mo., has been discontinued.

(1966) 8. Operation of the 34 locks in the Illinois and Mississippi (Hennepin) Canal, including the feeder section, has been discontinued.

(1967) 9. Operation of the Illinois and Michigan Canal has been discontinued.

(1968) **§207.390** (Reserved)

(1969) **§207.420 Chicago River, Ill.; Sanitary District controlling works, and the use, administration, and navigation of the lock at the mouth of river, Chicago Harbor.**

(1970) (a) Controlling works. The controlling works shall be so operated that the water level in the Chicago River will be maintained at a level lower than that of the lake, except in times of excessive storm run-off into the river or when the level of the lake is below minus 2 feet, Chicago City Datum.

(1971) (1) The elevation to be maintained in the Chicago River at the west end of the lock will be determined from time to time by the U.S. District Engineer, Chicago, Illinois. It shall at no time be higher than minus 0.5 foot, Chicago City Datum, and at no time lower than minus 2.0 feet, Chicago City Datum, except as noted in the preceding paragraph.

(1972) (b) Lock–(1) Operation. The lock shall be operated by the Metropolitan Sanitary District of Chicago under the general supervision of the U.S. District Engineer, Chicago, Illinois. The lock gates shall be kept in the closed position at all times except for the passage of navigation.

(1973) (2) Description of lock.

(1974) Clear length-600 feet.

(1975) Clear width-80 feet.

(1976) Depth over sills-24.4 feet (Note 1).

(1977) **Note 1.**–This depth is below Chicago City Datum which is the zero of the gages mounted on the lock. The clear depth below Low Water Datum for Lake Michigan, which is the plane of reference for National Ocean Survey charts, is 23.0 feet.

(1978) The east end of the northeast guide wall shall be marked by an intermittent red light, and by a traffic light showing a fixed red or fixed green light. The west end of the northwest gate block shall be marked by a traffic light showing a fixed red or fixed green light. The east end of the southeast guide wall and the west end of the southwest guide wall shall be marked by an intermittent white light.

(1979) (3) Authority of lockmasters. The lockmaster shall be charged with the immediate control and management of the lock, and of the area set aside as the lock area, including the lock approach channels. He shall see that all laws, rules and regulations for the use of the lock and lock area are duly complied with, to which end he is authorized to give all necessary orders and directions in accordance therewith, both to employees of the Government and to any and every person within the limits of the lock or lock area, whether navigating the lock or not. No one shall cause any movement of any vessel, boat, or other floating thing in the lock or approaches except by or under the direction of the lockmaster or his assistants.

(1980) (4) Signals. (i) Signals from vessels for lockage shall be by whistle, horn or by idling or standing near the ends of the lock guide walls. Signals from the lockmaster shall be by the traffic light and horn and/or by voice with or without electrical amplification. In case of emergency, the lockmaster may signal the vessel by wave of hand or lantern, and the signals thus given shall have the same weight as though given by visual or sound devices at the lock. Vessels must approach the lock with caution and shall not enter or leave the lock until signaled to do so by the lockmaster. The following lockage signals and duration of sound signals are prescribed. A long blast shall be of 4 second duration; a short blast shall be of 1 second duration.

(1981) (a) Vessel signals. Inbound vessels at a distance of not more than 4,000 feet from the lock and outbound vessels immediately after crossing under the Lake Shore Drive bridge shall signal for lockage by 2 long and 2 short blasts of a whistle or horn.

(1982) (b) Lock signals. (1) When the lock is ready for entrance, the traffic light will show green, and vessels under 500 gross tons shall come ahead under caution and enter the lock; vessels of 500 gross tons or more shall come to a stop along the guide wall, as prescribed in paragraph 5. Should the traffic light be out of order or be invisible due to thick weather, vessels shall upon 1 long blast of the lock horn approach and moor to the south guide wall or continue into the lock if so directed by the lockmaster.

(1983) (2) When the lock is not ready for entrance, the traffic light will show red, and vessels shall not pass beyond the end of the south guide wall: Provided, however, That vessels may approach and moor to said wall if authorized by 1 long blast of the lock horn.

(1984) (3) Permission to leave the lock shall be indicated by 1 short blast of the lock horn.

(1985) (4) Caution or danger will be indicated by 4 or more flashes of the red traffic light or 4 or more short blasts of the lock horn delivered in rapid succession.

(1986) (ii) When in the lock, vessels shall not blow whistle signals for tugs, bridges, landings, etc., without the lockmaster's permission.

(1987) (iii) The master and chief engineer of each vessel of 500 gross tons or more shall be on duty at their respective stations when passing through the lock.

(1988) (5) Stop before entering. All vessels or tows of 500 gross tons or more shall come to a full stop at the point indicated by the sign reading "Stop" on the south guide wall and shall not proceed into the lock until so directed by the lockmaster.

(1989) (6) Maximum draft. Vessels drawing within 6 inches of the depth over the sills shall not be permitted lockage except under special permission from the lockmaster.

(1990) (7) Precedence at locks. The vessel arriving first at a lock shall be first to lock through; but precedence shall be given to vessels belonging to the United States and to commercial vessels in the order named. Arrival posts or markers may be established ashore above or below the locks. Vessels arriving at or opposite such posts or markers will be considered as having arrived at the locks within the meaning of this paragraph.

(1991) (8) Lockage of pleasure boats. The lockage of pleasure boats, house boats or like craft shall be expedited by locking them through with commercial craft (other than barges carrying petroleum products or highly hazardous materials) in order to utilize the capacity of the lock to its maximum. If, after the arrival of such craft, no separate or combined lockage can be accomplished within a reasonable time, not to exceed the time required for three other lockages, then separate lockage shall be made.

(1992) (9) Speed of approach and departure. Vessels of 500 gross tons or more when approaching the lock shall navigate at a speed not exceeding 2 miles per hour, and when leaving the lock shall navigate at a speed not exceeding 6 miles per hour. While entering or leaving the lock, the propellers of vessels of 500 gross tons or more shall be operated at slow speed so as not to undermine or injure the concrete paving on the bottom of the lock chamber. Tugs assisting vessels in lockage, and Coast Guard and fire ves-

sels, may navigate at a higher speed when authorized by the lockmaster. Vessels of less than 500 gross tons shall operate at reasonable speed.

(1993) (10) Mooring. (i) Vessels shall be moored in the lock or along its approach walls in such a manner as may be directed by the lockmaster. Tying to lock ladders, lamp standards, or railings is strictly prohibited. Commercial vessels and tows of 500 gross tons or more shall, in general, have at least one line out when entering the lock and shall be moored in the lock with two bow and two stern lines, which shall lead forward and aft at each end of the vessel or tow. When the gates are closed, commercial vessels shall not be permitted to work their wheels. Said vessels shall have at least two seamen ashore to handle the mooring lines while they are in the lock.

(1994) (ii) Mooring lines shall not be cast off until after the lock gates have been opened fully into their recesses, and the signal given to leave the lock. The lines leading aft shall be released first. The lines leading forward shall not be released until the vessel has started to move forward, so as to prevent the vessel from drifting back into the lock gates.

(1995) (11) (Reserved)

(1996) (12) Unnecessary delay at lock. Masters and pilots must use every precaution to prevent unnecessary delay in entering or leaving the lock. Vessels failing to enter lock with reasonable promptness, when signaled to do so, shall lose their turn. Vessels arriving at the lock with their tows in such shape so as to impede lockage, shall lose their turn.

(1997) (13) Depositing refuse prohibited. The depositing of ashes or refuse matter of any kind in the lock; the passing of coal from barges or flats while in the lock; and the emission of dense smoke from any vessel while passing through the lock, is forbidden.

(1998) (14) Vessels denied lockage. The lockmaster may deny the privilege of passage through the lock to any vessel with sharp or rough projecting surfaces of any kind, or overhanging rigging, or any vessel which is badly leaking or in a sinking condition.

(1999) (15) Fenders. All barges and oil tankers must be provided with suitable nonmetallic fenders so as to eliminate damage to the lock or approach walls and reduce fire hazard. Said fenders shall be used as may be directed by the lockmaster.

(2000) (16) Operating machinery. Lock employees only shall be permitted to operate the lock gates, valves, signals or other appliances. Tampering or meddling with machinery or other parts of the lock is strictly forbidden.

(2001) (17) (Reserved)

(2002) (18) Vessels to carry regulations. A copy of the regulations in this section shall be kept at all times on board each vessel regularly engaged in navigating this lock. Copies may be obtained without charge from the lockmaster.

(2003) (19) Failure to comply with regulations. Any vessel failing to comply with this section or any orders given in pursuance thereof, may in the discretion of the lockmaster be denied the privilege of passage through or other use of the lock or appurtenant structures.

(2004) **§207.425 Calumet River, Ill.; Thomas J. O'Brien Lock and Controlling Works and the use, administration, and navigation of the lock.**

(2005) (a) Controlling Works. (1) The controlling works shall be so operated that the water level at the downstream end of the lock will be maintained at a level lower than that of Lake Michigan, except in times of excessive storm runoff into the Illinois Waterway, or when the lake level is below minus 2 feet, Chicago City Datum.

(2006) (2) The elevation to be maintained at the downstream end of the lock shall at no time be higher than minus 0.5 feet, Chicago City Datum, and at no time lower than minus 2.0 feet, Chicago City Datum, except as noted in paragraph (a)(1) of this section.

(2007) (b) Lock–(1) Operation. The Thomas J. O'Brien Lock and Dam is part of the Illinois Waterway which is a tributary of the Mississippi River. All rules and regulations defined in 207.300, Ohio River, Mississippi River above Cairo, Ill., and their tributaries; use, administration, and navigation shall apply.

(2008) **§207.440 St. Marys Falls Canal and Locks, Mich.; use, administration, and navigation.**

(2009) (a) The use, administration, and navigation of the canal and canal grounds shall be under the direction of the District Engineer, Engineer Department at Large, in charge of the locality, and his authorized agents. The term "canal" shall include all of the natural waters of the St. Marys River on the United States side of the International Boundary and all of the canalized waterway and the locks therein between the western or upstream limit, which is a north and south line tangent to the west end of the Northwest Pier, and the eastern or downstream limit, which is a north and south line tangent to the northeast corner of the old Fort Brady Reservation, the distance between limits being 1.9 miles. The term "canal grounds" shall include all of the United States part and other lands, piers, buildings, water level regulation works, hydroelectric power plant, and other appurtenances acquired or constructed for the channel improvement and use of the waterway.

(2010) **Note.**–Rules and regulations governing the movements of vessels and rafts in St. Marys River from Point Iroquois, on Lake Superior, to Point Detour, on Lake Huron, prescribed by the United States Coast Guard pursuant to 33 U.S.C. 475, are contained in 33 CFR 92.

(2011) (b) Masters of all registered vessels approaching and desiring to use the locks shall, upon arriving at Sailors Encampment, Little Rapids Cut, and Brush Point, report the name of the vessel and its draft to the Coast Guard Lookout Stations at those points.

(2012) **Note.**–The Coast Guard lookout stations have been disestablished; instead call Soo Control.

(2013) (c) Upon approaching the canal, vessel masters shall request lock dispatch by radiotelephone to the Corps of Engineers Chief Lockmaster at St. Mary's Falls Canal dispatch tower (Radio Call WUD-31). Every upbound vessel shall call when abeam of Bayfield Rock Pile Dike which is approximately one and one-eighth miles downstream from East Center Pier end. Every downbound vessel shall call when approximately one-half mile downstream from Big Point.

(2014) (d) When in the locks, vessels shall not blow whistle signals for tugs, supply vessels, or persons unless authorized to do so by the District Engineer or his authorized agents.

(2015) (e) On all vessels of 400 gross tons or over navigating the canal under their own power, there shall be on duty the following ship's officers: In the pilot house, on the bridge, or in the immediate vicinity thereof, the master, one mate, and one wheelsman; in the engine room, the chief engineer, one assistant engineer, and one oiler or other member of the crew familiar with the operation of the engine. During transit of the locks, all vessels of 400 gross tons or over equipped with power operated mooring deck winches shall have, in addition to the winch operators, mates or signalmen at the forward and after ends of the vessel to direct operations from points providing maximum vision of both the winch operators and canal linesmen.

(2016) (f) Within the limits of the canal, vessels approaching the locks shall not navigate at a speed greater than 2½ miles per hour,

and vessels leaving the locks shall not navigate at a speed greater than 6 miles per hour. Tugs assisting vessels in passing the locks may be authorized by the District Engineer or his authorized agents to navigate at a higher speed when considered necessary to expedite canal operations.

(2017) (g) For passage through the canal, vessels or boats owned or operated by the United States Government may be given precedence over all others.

(2018) (h) All registered vessels will be passed through the locks in the order of their arrival at the canal, unless otherwise directed by the District Engineer or his authorized agents. When a vessel that has stopped on its own business is ready to proceed, it is not entitled to precedence over other vessels already dispatched even though it may have preceded such vessels in arriving at any coast Guard Lookout Station. Unregistered craft must have a special permit for separate lockage.

(2019) (i) Unless otherwise directed, all vessels or boats approaching the locks shall stop at the points indicated by signs placed on the canal piers until ordered by the DistrictEngineer or his authorized agents to proceed into the lock.

(2020) (j) Vessels and boats shall not proceed to enter or leave a lock until the lock gates are fully in their recesses and the lockmaster has given directions for starting.

(2021) (k) Upon each passage through the canal, the master or clerk of the vessel or craft shall report to the canal office, upon the prescribed form, a statement of passengers, freight, and registered tonnage, and such other statistical information as may be required by the blank forms provided for the purpose.

(2022) (1) No business, trading, or loading or landing of freight, baggage, or passengers will be allowed on or over the canal piers or lock walls, or over the other piers within the limits of the canal grounds, except by prior authority of the District Engineer or his authorized agents.

(2023) (m) No person shall throw material of any kind into the canal, or litter the grounds with any refuse.

(2024) (n) The releasing of vessel steam, water, or waste from side discharge openings upon the piers or lock walls, the cleaning of boiler flues in the locks or canal, or the emission of dense smoke from the stack of any vessel while passing through the locks, is forbidden.

(2025) (o) No person shall enter or navigate the canal with a boat or other craft which, when entering or while navigating the canal, shall have an iron or irons projecting from it or a rough surface or surfaces on it which would be liable to damage the lock walls or canal piers.

(2026) (p) No person shall cause or permit any vessel or boat of which he is in charge or on which he is employed to in any way obstruct the canal or delay in passing through it, except upon prior authority of the District Engineer or his authorized agents.

(2027) (q) No person shall enter upon any part of the canal grounds except as permitted, either generally or in specific instances, by the District Engineer or his authorized agents. No person shall willfully or carelessly injure, tamper with, or damage the canal or any of the Government buildings, works or structures, trees or shrubbery, or other public property pertaining to the canal or canal grounds.

(2028) (r) All barges or other vessels navigating within the canal and not operated under their own power, whether approaching or leaving the locks, are required to be assisted by one or more tugs of sufficient power to insure full control at all times.

(2029) (s) Smoking and open flames are prohibited on the canal grounds within 50 feet of any tanker transiting the canal and locks, and on board the tanker transiting the locks except in such places as may be designated in the ship's regulations.

(2030) (t) All oil tankers, barges, and other vessels which are used for transporting inflammable liquids, either with or without cargo, shall, if not equipped with fixed timber fenders, be prevented from contacting any unfendered pier, lock wall, or other structure by an adequate number of suitable fenders of timber, rubber, or rope placed between the vessel and such unfendered structure.

(2031) (u) The locks will be opened and closed to navigation each year as provided in paragraphs (u)(1) and (2) of this section except as may be authorized by the Division Engineer. Consideration will be given to change in these dates in an emergency involving disaster to a vessel or other extraordinary circumstances.

(2032) (1) Opening date. At least one lock will be placed in operation for the passage of vessels on March 25. Thereafter, additional locks will be placed in operation as traffic density demands.

(2033) (2) Closing date. The locks will be maintained in operation only for the passage of downbound vessels departing from a Lake Superior port before midnight (2400 hours) of January 14, and of upbound vessels passing Detour before midnight (2400 hours) of January 15. Vessel owners are requested to report in advance to the Engineer in charge at Sault Ste. Marie, the name of vessel and time of departure from a Lake Superior port on January 14 before midnight, and of vessels passing Detour on January 15 before midnight, which may necessitate the continued operation of a lock to permit passage of vessel.

(2034) (v) The maximum overall dimensions of vessels that will be permitted to transit MacArthur Lock are 730 feet in length and 75 feet in width, except as provided in paragraph (v)(1) of this section. Further, any vessel of greater length than 600 feet must be equipped with deck winches adequate to safely control the vessel in the lock under all conditions including that of power failure.

(2035) (1) Whenever the Poe Lock is out of service for a period exceeding 24 hours the District Engineer may allow vessels greater than 730 feet in length, but not exceeding 767 feet in length to navigate the MacArthur Lock. Masters of vessels exceeding 730 feet in length shall be required to adhere to special handling procedures as prescribed by the District Engineer.

(2036) (w) The maximum overall dimensions of vessels that will be permitted to transit the New Poe Lock without special restrictions are 100 feet in width, including fendering, and 1,000 feet in length, including steering poles or other projections. Vessels having overall widths of over 100 feet and not over 105 feet including fendering, and overall lengths of not more than 1,100 feet, including projections, will be permitted to transit the New Poe Lock at such times as determined by the District Engineer or his authorized representative that they will not unduly delay the transit of vessels of lesser dimensions or endanger the lock structure because of wind, ice, or other adverse conditions. These vessels also will be subject to such special handling requirements as may be found necessary by the Area Engineer at time of transit. Vessels over 1,000 feet in length will be required to be equipped with six mooring cables and winches ready for use to assist in safe transit of the lock.

(2037) (x) Masters or other persons refusing to comply with the regulations in this section or any orders given in pursuance thereof, or using profane, indecent, or abusive language, may, in the discretion of the District Engineer or his authorized agents, be denied the privileges of the locks and canal grounds.

(2038) **§207.441 St. Marys Falls Canal and Locks, Mich.; security.**

(2039) (a) Purpose and scope of the regulations. The regulations in this section are prescribed as protective measures. They supplement the general regulations contained in §207.440 the provisions of which shall remain in full force and effect except as modified by this section.

(2040) (b) Restrictions on transit of vessels. The following classes of vessels will not be permitted to transit the United States locks or enter any of the United States approach canals:

(2041) (1) (Reserved)

(2042) (2) (Reserved)

(2043) (3) (Reserved)

(2044) (4) All oil tankers having draft and beam permitting transit through the Canadian lock; those having too great a draft or beam to transit the Canadian lock may continue to use the United States locks. Tankers using the United States locks will not be transited through the MacArthur Lock unless their drafts make it necessary. All tanker transits shall be in single lockages. While in the lock area, smoking by personnel aboard tankers is prohibited in any part of the vessel regardless of locations.

(2045) (5) All vessels carrying explosives.

(2046) (c) Personnel restrictions. Masters of vessels are responsible for the conduct of crew and passengers while transiting St. Marys Falls Canal and Locks and for strict compliance with the regulations. The following procedures are established for the control of persons embarking or debarking from vessels while transiting the locks:

(2047) (1) The master or mate and not more than three deckhands will be permitted to go ashore from transiting vessels and then only for normal operations and business incident to the transit. A maximum of four men will be permitted ashore at any one time from any one ship.

(2048) (2) Personnel–(i) Embarking. Personnel, including technicians, repairmen, and company officials will be permitted to embark at the locks if they are in possession of a letter addressed to the Area Engineer, St. Marys Falls Canal, Sault Ste. Marie, Michigan, from the vessel's master, the operators of the vessel, or the Lake Carriers' Association, requesting that the individual named therein be permitted to embark on a particular vessel. United States vessel personnel must also be in possession of a specially validated seaman's document issued by the United States Coast Guard. Their papers will be presented to the civilian guard on duty at the main gate on Portage Avenue who will arrange escort from the gate to the vessel. Luggage will be subject to inspection.

(2049) (ii) Debarking. The vessel master will furnish prior notification to the Chief Lockmaster at St. Marys Falls Canal Tower (Radio Call WUD-31) that he has vessel personnel, technicians, repairmen or company officials aboard for whom he requests authority to debark. If authority to debark is granted such personnel will be furnished a letter by the vessel master, addressed to the Area Engineer, St. Marys Falls Canal, Sault Ste. Marie, Michigan, giving the name and position of the individual concerned. Personnel will not debark until they have been properly identified by a licensed officer of the vessel and the letter furnished to the escort provided from the civilian guard detail who will escort personnel to the gate. In the event a person debarking for medical attention is a litter case, notification will be given sufficiently in advance to permit the Chief Lockmaster to route the vessel to the MacArthur Lock in order that the long carry over the lock gates may be avoided. The Area Engineer will make the necessary arrangements for clearance of ambulances and medical personnel into the lock area.

(2050) (3) No passengers or guest passengers will be permitted to embark or debark at St. Marys Falls Canal except in emergency when medical attention is required.

(2051) (4) Letters cited in paragraph (c)(2) of this section are valid only for a single passage through the lock area. In the event frequent access to the area is required a request for extended access with reasons therefor will be submitted to the Area Engineer, St. Marys Falls Canal, Sault Ste. Marie, Michigan, who may arrange for the necessary clearance.

(2052) (5) Emergency needs to embark or debark which develop with insufficient time to follow the procedure outlined in this paragraph will be approved or disapproved by the Area Engineer, St. Marys Falls Canal, Sault Ste. Marie, Michigan, according to the circumstances of the individual case, and requests therefor should be promptly directed to him.

(2053) **§207.460 Fox River, Wis.**

(2054) (a) Use, Administration, and Navigation of the Locks and Canals. (1) Navigation. The Fox River and Wolf River navigation seasons will commence and close as determined by the district engineer, Corps of Engineers, in charge of the locality, depending on conditions and need for lock service. Days and hours of lock operation will also be determined by the district engineer. Public notices will be issued announcing or revising the opening and closing dates and operating schedules at least 10 days in advance of such dates.

(2055) (2) Authority of lockmaster. The movement of all boats, vessels, tows, rafts and floating things, both powered and nonpowered, in the canals and locks, approaches to the canals, and at or near the dams, shall be subject to the direction of the lockmaster or his duly authorized representatives in charge at the locks.

(2056) (3) Signals. All boats approaching the locks shall signal for lockage by four distinct whistles of short duration. Locks will not be opened on such audible signal during the period when advance notice is required if the services of the lock tender are required elsewhere to meet prior requests for lockages.

(2057) (4) Mooring in locks. All craft being locked shall be secured to the mooring posts on the lock walls. Large craft shall use one head line and at least one spring line. Lines shall remain fastened until the signal is given by the lock tender for the craft to leave the lock.

(2058) (5) Delays in canals. No boat, barge, raft or other floating craft shall tie up or in any way obstruct the canals or approaches, or delay entering or leaving the locks, except by permission from proper authority. Boats wishing to tie up for some hours or days in the canals must notify the Project Engineer directly or through a lock tender, and proper orders on the case will be given. Boats so using the canals must be securely moored in the places assigned, and if not removed promptly on due notice, will be removed, as directed by the Project Engineer at the owner's expense. Boats desiring to tie up in the canals for the purpose of unloading cargoes over the canal banks must, in each case, obtain permission in advance from the District Engineer. Request for such permission shall be submitted through the Project Engineer.

(2059) (6) Provisions for lockage service. (i) Commercial vessels, barges, rafts and tows engaged in commerce will be provided lockages during the same period as provided for pleasure boats (see paragraph (a)(6)(iv) of this section).

(2060) (ii) Pleasure boats, powered and nonpowered, houseboats and similar craft will be provided with not more than one lockage each way through the same lock in a 24-hour period.

(2061) (iii) All small vessels or craft, such as skiffs, sculls, sailing boats, etc., shall be passed through locks in groups of not less than six at one lockage, or may be granted separate lockage if the traffic load at the time permits.

(2062) (iv) Lockage may be provided during certain hours other than announced at the intermediate locks provided prior requests are made to the Corps of Engineers, Fox River Project Office. Requests may be made either in writing, by telephone or in person to U.S. Army Corps of Engineers, Fox River Project Office, 1008 Augustine Street, Kaukauna, Wisconsin 54130, telephone: 414-766-3531.

(2063) (7) Injury to locks or fixtures. Vessel operators shall use great care not to strike any part of the locks or sluice walls, or any gate or appurtenance thereto, or machinery for operating the gates, or the walls protecting the banks of the canals. All boats using the canals shall be free from projecting irons or rough surfaces that would be liable to damage the locks or any part of the canals, and they must be provided with fenders to be used in guarding the lock walls, etc., from injury. Boats will not be permitted to enter or leave the locks until the lock gates are fully in the gate recesses, and the lock tender has directed the boat to proceed. No vessel shall be raced or crowded alongside another vessel, or be moved at such speed as will cause excessive swells or wash. Speed shall be kept at a minimum consistent with safe navigation.

(2064) (8) Handling gates. No one, unless authorized by the lock tender, shall open or close any gate, or valve, or in any way interfere with the employees in the discharge of their duties. The lock tender may call for assistance from the master of any boat using the lock should such aid be needed.

(2065) (9) Draft of boats. No boat shall enter a canal or lock whose actual draft exceeds the least depth of water in the channel of the canal as given by the Project Engineer.

(2066) (10) Right-of-way. Boats going downstream shall have the right-of-way over boats going upstream. Ordinarily, the boats or tows arriving first at any of the locks shall have precedence in passage except that those vessels which have given advance notice, when such notice is required, shall have precedence over other vessels when such notifying vessel is ready for passage. In all cases boats and barges belonging to the United States, or employed upon public works, shall have precedence over all others, and commercial passenger boats shall have precedence over tows. All boats not taking advantage of the first lawful opportunity to pass shall lose their turn. When lockage has started on tows requiring multiple lockages, all units of the tow will be locked ahead of other vessels traveling in the same direction. In the case of tows requiring two lockages, any craft awaiting lockage in the opposite direction will have priority over the second lockage of the tow.

(2067) (11) Boats and rafts without power. No boat or raft without power except small boats controlled by sails or oars shall be brought through the canal unless accompanied by a power operated boat.

(2068) (12) Dumping of refuse in waterway. No refuse or other material shall be thrown or dumped from vessels into the natural river, improved channels, canals and locks or placed on any bank of the river or berm of the canals so that it is liable to be thrown or washed into the waterway. (Section 13 of the River and Harbor Act of March 3, 1899 (30 Stat. 1152; 33 U.S.C. 407) prohibits the depositing of any refuse matter in any navigable water or along the banks thereof where the same shall be liable to be washed into such navigable water.)

(2069) (13) Drawing off water. No water shall be drawn by any party or parties from any portion of the Fox River canals, or of the Fox River, including its lakes, improved channels, and unimproved channels, to such extent as to lower the water surface below the crest of that dam next below the place where such draft of water is affected.

(2070) (14) Obstructing navigation. Anyone who shall willfully or through carelessness in any way obstruct the free navigation of the waterway, or by violation of any of the laws or regulations governing the waterway and those using it, delay or inconvenience any boat having the right to use the waterway, shall be responsible for all damages and delays, and for all expenses for removing the obstructions. (Section 20 of the River and Harbor Act of March 3, 1899 (30 Stat. 1154; 33 U.S.C. 415), authorizes the immediate removal or destruction of any sunken vessel, craft, or similar obstruction, which impedes or endangers navigation.)

(2071) (15) (Reserved)

(2072) (16) Trespass on United States property. Trespass on waterway property or injury to the banks, locks, dams, canals, piers, fences, trees, buildings, or any other property of the United States pertaining to the waterway is strictly prohibited. No business, trading or landing of freight or baggage will be allowed on or over Government property, unless a permit or lease approved by the Secretary of the Army has been secured.

(2073) (17) Neenah dam outlet works. (i) During periods of high water, when determined to be necessary by the District Engineer, U.S. Army Engineer District, Chicago, to reduce the threat of flooding, it shall be the duty of the person owning, operating, or controlling the dam across the Neenah Channel of the Fox River at Neenah, Wis., acting as agent of the United States, to open or close, or cause to be opened or closed, pursuant to paragraph (a)(17)(ii) of this section, the outlet works of said dam to regulate the passage of water through said outlet works.

(2074) (ii) The outlet works of said dam shall be opened when and to the extent directed by the District Engineer or his authorized field representatives, and said outlet works shall thereafter be closed when and to the extent directed by the said District Engineer or his authorized field representative.

(2075) (b) Use of the United States drydock on Fox River at Kaukauna, Wis. (1) The drydock being a part of the Fox River improvement, its use will be governed by the general regulations for the use, administration, and navigation of that river, so far as they may be applicable.

(2076) (2) The drydock at Kaukauna, when not required for repairs or construction by the United States, may be used by private parties or corporations under certain restrictions and under the supervision and direction of the United States District Engineer in charge of the locality or his authorized agent.

(2077) (3) The drydock will be loaned to private parties only when no private drydock is available at the time and for the purpose desired. Applicants will be required to establish over their signature the fact that due effort has been made to secure the use of a private drydock and none can be had.

(2078) (4) Private parties desiring to use the Kaukauna drydock will give notice to the United States Assistant Engineer in local charge at Appleton, Wis., as long in advance as practicable, stating when use of the dock is wanted, nature of repairs required, and the dimensions and character of boat. No boat will enter the dock until the permission of the United States District Engineer or the Assistant Engineer above referred to has been obtained.

(2079) (5) All private parties or corporations using the Kaukauna drydock will furnish all material and labor, including blocking, when necessary, required for prompt execution of their work, and will also furnish all labor for properly operating, under the immediate personal supervision of an authorized canal employee, gates,

and sluices of the drydock. No gate or sluice of the drydock will be operated, or in any way meddled with, except by permission of and under the personal supervision of such authorized canal employee.

(2080) (6) No boat will be allowed to occupy the Kaukauna drydock for a longer period than 2 days when other boats are waiting to use the dock, except in cases when, in the opinion of the United States District Engineer or his authorized agent, circumstances necessitate and justify a longer use than 2 days. The United States District Engineer or his authorized agent is authorized to remove from the drydock any boat using or occupying such dock without his authority, and the expense of such removal will be paid by the party or parties owning such boat.

(2081) (7) The wages of all mechanics and laborers, due from private parties for repairs carried on in the Kaukauna drydock, must be paid before the boat leaves the dock.

(2082) (8) Repair shop, timber shed, tools, etc., owned by the Government at and near the drydock shall not be used by parties allowed to occupy the drydock.

(2083) (9) Lumber and all material needed by parties allowed to use the drydock may be deposited in the drydock yards at such places as may be directed, but only for such time as repairs are being made, and residue must be entirely removed when the boat leaves the dock; general storage will not be permitted.

(2084) (10) All refuse and old material taken from boats under repairs must be removed or disposed of, as may be directed, by the owner of the boat or his employees without expense to the Government, and before the boat leaves the dock, and to the satisfaction of the agent in charge of the dock.

(2085) (11) The Government charges for the authorized and necessary use and occupancy of the Kaukauna drydock by private boats shall be, until further orders, as follows:

(2086) (i) Docking charges (including lay time for the calendar day on which vessel is docked): Tugs, motor boats, and dredges, 75 cents per linear foot; $25 minimum charge. Barges, dump scows, and derrick boats, 65 cents per linear foot; $20 minimum charge.

(2087) (ii) Lay-day charges (excluding Sundays and national holidays, unless repairs are made on such Sundays and holidays): For all vessels, 20 cents per linear foot per calendar day or part thereof; $7 per calendar day or part thereof, minimum charge.

(2088) (12) The charges for all use or occupancy of the Kaukauna drydock by a boat or private parties, after repairs on such boat have, in the opinion of the United States District Engineer or authorized agent, been so far completed as to permit safe removal from the dock, or after such removal has been ordered by the United States District Engineer or his authorized agent, shall be $50 per day or part of a day, in addition to any penalties incurred for violation of any of the regulations prescribed by law for the government of the dock and those using it.

(2089) (13) The dock will be considered in use by a boat from the time the dock is placed at its disposal until the boat is out of the dock.

(2090) (14) The length of all vessels shall be the over-all length measured on the main deck from stem to stern.

(2091) (15) The charges for the use of the drydock shall be paid within 10 days from date of bill, which will be submitted to the owner by the District Engineer as promptly as possible after the vessel leaves the dock. If charges are not so paid, the vessel shall be liable to the amount of the charges and the cost of collection in the manner prescribed by law, and the owner of the vessel shall be denied the use of the drydock until all charges and the cost of collection have been paid to the United States.

(2092) (16) This section supersedes the regulations for the use of this drydock approved April 10, 1906, which regulations are hereby revoked.

(2093) **§207.470 Sturgeon Bay and Lake Michigan Ship Canal, Wis., use and navigation.**

(2094) (a) Authority of canal officers. The movement of all boats and floating things in the canal and in the approaches thereto shall be under the direction of the superintendent or his authorized assistants, and their orders and instructions must be obeyed.

(2095) (b) Signals. On entering the canal at either entrance, steamers or tugs must blow their whistles for 1 minute in order to warn craft approaching from opposite direction and give them time to guard against collisions, by tying up if necessary. All steamers approaching others going in the opposite direction shall slacken speed so as to pass in safety. Compliance is required with rule V of the rules and regulations for government of pilots, adopted by the United States Coast Guard.

(2096) Rule V. Whenever a steamer is nearing a short bend or curve in the channel where, from the height of the banks or other cause, a steamer approaching from the opposite direction cannot be seen for a distance of half a mile, the pilot of such steamer, when he shall have arrived within half a mile of such curve or bend, shall give a signal by one long blast of the steam whistle, which signal shall be answered by a similar blast by the pilot of any approaching steamer that may be within hearing. Should such signal be so answered by a steamer upon the farther side of such bend, then the usual signals for the meeting and passing shall immediately be given and answered; but if the first alarm signal of such pilot be not answered, he is to consider the channel clear and govern himself accordingly.

(2097) (c) Speed. The rate of speed while passing through the canal shall not exceed 5 miles per hour.

(2098) (d) Keeping in the center. The center must be kept all the way through, except in passing other craft. In case of grounding, the rapid or strong working of boat's engines is strictly forbidden.

(2099) (e)-(g) (Reserved)

(2100) (h) Rafts. (1) The passage of bag or sack rafts, or of loose logs, into or through the canal is prohibited.

(2101) (2) Rafts shall be made up with logs parallel to each other, in the direction of raft lengths, secured and held closely together by frequent cross-sticks, chains, or cables.

(2102) (3) Rafts shall not be of greater dimensions, either way, than 50 feet wide by 600 feet long, and if longer than 300 feet shall be handled by two tugs.

(2103) (4) No raft shall pass through the canal, unless by special permission of the superintendent or his authorized assistants, who will direct a time for passing that will least interfere with other navigation.

(2104) (5) Masters of tugs and other persons in charge of rafts are required to avoid damaging the canal revetments, and displacing buoys, spars, or the pedestal of any range light aiding navigation through the canal. They shall keep careful watch when passing aids to navigation, and should any be accidentally displaced, shall report the fact at the earliest possible moment to the superintendent or his authorized assistants.

(2105) (i) through (l) (Reserved)

(2106) (m) Refuse in canal. No person shall roll or throw any stones, ashes, cinders, or other material into the canal or the approaches thereto, or place any such material on any bank or berm of the canal so that it is liable to be thrown or roll in.

(2107) (n) (Reserved)

(2108) (o) (Reserved)

(2109) **§207.476 The Inland Route-lock in Crooked River, Alanson, Mich., use, administration, and navigation.**

(2110) (a) General. The use, administration, and navigation of the lock shall be under the direction and supervision of the District Engineer, U.S. Army Engineer District, Detroit, Mich., and his authorized agents.

(2111) (b) Authority of lockmaster. The lockmaster shall be charged with the immediate control and management of the lock, and of the area set aside as the lock area, including the lock approach channels. He shall see that all laws, rules, and regulations for the use of the lock and lock area are duly complied with, to which end he is authorized to give all necessary orders and directions in accordance therewith, both to the employees of the Government and to any and every person within the limits of the lock area, whether navigating the lock or not. No one shall cause any movement of any boat, craft or other floating object in the lock or approaches except by or under the direction of the lockmaster or his assistants.

(2112) (c) Operation. The lock operating season will commence and close as determined by the district engineers, Corps of Engineers in charge of the locality, depending on conditions and the need for lockage services. Public notices will be issued announcing the opening and closing dates at least 15 days in advance of such dates.

(2113) (d) Maximum allowable dimensions of craft. (1) Overall length-60 feet.

(2114) (2) Overall width-16 feet.

(2115) (3) Height above water-15 feet when upper pool is at low water datum.

(2116) (4) Draft-6 feet when lower pool is at low water datum.

(2117) (e) Signals. (1) Craft desiring lockage in either direction shall give notice to the lock tenders, when not farther than 200 yards from the lock, by one long blast (of 10 seconds duration) followed by one short blast (of 3 seconds duration) of whistle, horn, or siren.

(2118) (2) Craft not equipped with whistle, horn, or siren may signal for lockage by use of the signal provided for this purpose located near the extreme end of the guide wall to the starboard side of the craft, both upbound and downbound.

(2119) (f) The procedures for transit of lock. (1) Stand clear of the lock while the red signal light shows.

(2120) (2) When the green signal light shows and the lock horn sounds three blasts, approach and enter the lock.

(2121) (3) Full control of the craft must be maintained while entering the lock.

(2122) (4) After entrance to the lock is complete, the craft shall be securely moored to the cleats and bitts situated on the lock wall.

(2123) (5) While moored in the lock, the operator of the craft shall maintain constant attention to the mooring lines, to provide slack or retain tautness as needed.

(2124) (6) The craft shall remain securely moored until the exit lock gate is fully open and the lock horn sounds one blast.

(2125) (7) When the exit lock gate is fully open and the lock horn has sounded one blast, the craft shall immediately leave the lock under full control of its operator.

(2126) (g) Precedence at lock. The craft arriving first at the lock shall be first to lock through; but precedence will be given to craft belonging to the United States or to other local government entities, such as State, county, or municipality. Arrival posts may be established above and below the lock. Craft arriving at or opposite such posts or markers will be considered as having arrived at the locks within the meaning of this paragraph.

(2127) **§207.480 Lake Huron, Mich.; Harbor of refuge, Harbor Beach, use and navigation.**

(2128) (a) All boats, barges, and vessels entering the harbor will be required to take such positions as may be assigned them by the officer in charge, who will direct their movements, either from the breakwater or from the Government tug on the harbor.

(2129) (b) In the absence of any directions as to position, boats, barges, and vessels entering the harbor will observe the following rule: The first steam vessel, or the first steam vessel with consort in tow, on entering the harbor for shelter, will proceed to the upper end of the breakwater. All steam vessels, and all steam vessels with consorts in tow, entering later, will place themselves in a compact position close to those preceding them. Sailing craft will so locate themselves that they will not lie in the way of other vessels entering the harbor. All vessels of every description will in no way place themselves so as to interfere with the work of reconstruction of piers, or repairs, that may be in progress at the time.

(2130) (c) The use of chains in making fast to the breakwater will not be permitted. Lines must be attached to the snubbing posts only, and outboard anchors taken in.

(2131) (d) Steam craft with barges or vessels in tow will, if practicable, at once place them compactly alongside the breakwater, either taking in the towlines entirely or passing them on the breakwater so as not to interfere in any way with the landing or departure of boats or vessels between them. If impracticable to place them alongside the breakwater, they will each drop anchor and at once take in all towlines extending from one to the other.

(2132) (e) Passenger boats will, in general, have the preference as to location and attention by the officer in charge. Rafts will give way to all documented craft.

(2133) (f) All classes of boats, barges, vessels, or other floating property making fast to the breakwater must at once place such fenders between themselves and the breakwater as may be thought necessary by the officer in charge to prevent chafing or other damage.

(2134) (g) The unloading of wood, coal, ballast, stone, or freight of any class upon the breakwater is expressly prohibited, except in certain cases allowed by special permission from the officer in charge.

(2135) (h) Each and every piece of floating property made fast to the breakwater, or anchored in the harbor, must keep outboard from sunset to sunrise a conspicuous white light, and must have upon it and in immediate charge of it a watchman during the entire time such floating property is in the harbor. All colored lights must be at once taken in, or covered, on dropping anchor or making fast to the breakwater.

(2136) **§207.560 Sandusky Harbor, Ohio; use, administration, and navigation.**

(2137) (a) through (c) (Reserved)

(2138) (d) No vessel shall moor or anchor to any structure of the United States without the consent of the District Engineer, U.S. Army, in charge of the locality, or his authorized agent.

(2139) (e) No vessel shall moor or anchor in or along any improved channel or basin in such manner as to interfere with improvement or maintenance operations therein. Whenever in the opinion of the District Engineer any vessel is so moored or anchored, the owner thereof shall cause said vessel to be moved upon notification from and within the time specified by said District Engineer.

(2140) **§207.565 Vermilion Harbor, Ohio; use, administration, and navigation.**

(2141) (a) and (b) (Reserved)

(2142) (c) No vessel or other craft shall moor or anchor to any structure of the United States without the consent of the District Engineer, Corps of Engineers.

(2143) (d) No vessel or other craft shall moor or anchor in or along any improved channel or basin in such a manner as to interfere with the improvement or maintenance operations therein. Whenever in the opinion of the District Engineer any vessel or craft is so moored or anchored, the owner thereof shall cause such vessel or craft to be moved upon notification from, and within the time specified by, the District Engineer.

(2144) **§207.570 Harbors of Huron, Lorain, Cleveland, Fairport, Ashtabula, Conneaut, Ohio; use, administration, and navigation.**

(2145) (a) and (b) (Reserved)

(2146) (c) No vessel shall moor or anchor to any structure of the United States without the consent of the District Engineer, U.S. Army, in charge of the locality, or his authorized agent.

(2147) (d) No vessel shall moor or anchor in or along any improved channel or basin in such manner as to interfere with improvement or maintenance operations therein. Whenever in the opinion of the District Engineer any vessel is so moored or anchored, the owner thereof shall cause said vessel to be moved upon notification from and within the time specified by said District Engineer.

(2148) **§207.580 Buffalo Harbor, N.Y.; use, administration, and navigation.**

(2149) (a) and (b) (Reserved)

(2150) (c) No vessel shall moor or anchor to any structure of the United States without the consent of the District Engineer, U.S. Army, in charge of the locality, or his authorized agent.

(2151) (d) No vessel shall moor or anchor in or along any improved channel or basin in such manner as to interfere with improvement or maintenance operations therein. Whenever in the opinion of the District Engineer any vessel is so moored or anchored, the owner thereof shall cause said vessel to be moved upon notification from and within the time specified by said District Engineer.

(2152) **§207.590 Black Rock Canal and Lock at Buffalo, N.Y.; use, administration and navigation.**

(2153) (a) The term "canal" when used in this section will mean all of the Black Rock Waterway, including Black Rock Lock, and all of the lands, piers, buildings, and other appurtenances acquired by letters patent from the State of New York, or constructed for the use of the waterway; the southerly limit thereof being at the southerly end of Bird Island Pier, and the northerly limit being at the downstream end of the guide pier, Black Rock Lock, a length of 3.7 miles.

(2154) (b) The canal and all of its appurtenances and the use, administration and navigation thereof shall be in charge of the District Engineer, U.S. Army Engineer District, in charge of the locality, or his authorized agents.

(2155) (c) The movement of all vessels, boats, or other floating things in the canal shall be under the direction of the authorized agents of the District Engineer in charge, and their orders and instructions must be obeyed.

(2156) (d) For passage through the canal, vessels or boats belonging to the U.S. Government shall have precedence over all others.

(2157) (e) All registered vessels or boats must pass through the canal in order of their arrival at the canal limits, unless otherwise directed in accordance with this section.

(2158) (f) (Reserved)

(2159) (g) No vessel shall pass or approach within ¼-mile of a vessel bound in the same direction in the Black Rock Canal south of the Ferry Street Bridge. Tugs without tows, tugs towing a single barge under 150 feet in length, and single vessels under 150 feet in length are exempt from this paragraph.

(2160) (h) No vessel or boat shall anchor in or moor along the canal except at localities specially designated by the District Engineer or his agent; and no business, trading, or landing of freight or baggage, except such articles as may be readily carried in the hand, will be allowed on or over the canal lands or structures, without the permission of the District Engineer or his agent.

(2161) (i) No person or operator of a vessel in the Black Rock Canal, lock or approaching channels shall throw or discharge or permit to be thrown or discharged any solid material of any kind or any petroleum product of any kind into the canal, lock or appurtenant waters.

(2162) (j) All vessels and tows shall be navigated with care so as not to strike or disturb the channel buoys or channel markers. If a buoy or other channel marker is accidentally struck, damaged or displaced, the fact shall be reported immediately to the Black Rock Lock, foot of Bridge Street, Buffalo, N.Y., telephone 876-5454.

(2163) (k) Ferry Street Bridge: The clear headroom under the bridge at low water datum is 17.3 feet for a width of 86 feet from the pivot pier, thence decreasing to 12.3 feet at the left (westerly) abutment.

(2164) (1) All vessels and boats which cannot pass under the bridge shall, on approaching the bridge, reduce speed sufficiently to enable them to come to a dead stop, without touching the bridge, in case the movable span cannot be lifted. If the wind is dangerously strong, passage of the bridge shall not be attempted by large vessels without the aid of a tug or tugs.

(2165) (2) Vessels and boats bound north shall have the right-of-way and priority for passage through the bridge over those bound south.

(2166) (3) All vessels and boats desiring passage through the bridge shall signal therefor by one long and two short whistle blasts.

(2167) (4) Upon receiving the opening signal, the bridge operator shall answer by giving the same signal on the bridge whistle and he shall then proceed at once to lift the bridge.

(2168) (5) In case the bridge cannot be lifted, for any cause, the bridge operator shall answer a vessel signal by giving five short whistle blasts; and the vessel shall then be stopped until the bridge is ready to be lifted, when the bridge operator shall give the whistle signal for passage and the vessel may proceed.

(2169) (6) In case the bridge is disabled so that it cannot be lifted for one-half hour or more pending repairs, red flags will be displayed on the bridge in daytime and two red lantern lights, one above the other, at night; and when such signals are displayed no vessel or boat shall signal for or attempt passage through the bridge.

(2170) (1) Radio Control of vessel movement in Black Rock Canal: (1) The movement of vessels in the Black Rock Canal will be controlled by radio communication between the Black Rock Lock and the vessels desiring to use the canal. Vessels will not be permitted to meet or pass in the channel of restricted width between the southerly end of Bird Island (approximately 3,500 feet northerly along the canal from the North Breakwater South End Light) and the International Railway Bridge near the southerly entrance to the Black Rock Lock. Vessels less than 150 feet in length and tugs towing a single barge under 150 feet in length are not to be included in this special condition. In addition to the con-

trol of vessel movements in the restricted section of the canal, radio communications will also be utilized to facilitate the passage of vessels through the entire canal and the Black Rock Lock.

(2171) (2) Radio communication will be the only means of control of vessel traffic in the canal in order to prevent a meeting or passing of vessels in the restricted area, and therefore it is mandatory that all vessels over 150 feet in length and tugs towing a barge or barges over 150 feet in combined length of tow be equipped with radio communication equipment operating on designated frequencies. Any vessel lacking such equipment will not be permitted to enter the canal unless arrangements are made with the Black Rock Lock by land telephone to 876-5454 or marine ship-to-shore facilities immediately before entering the canal.

(2172) (3) The Black Rock Lock radio communications equipment operates on VHF(FM) frequencies as follows: VHF–156.8 MHz–Channel 16–Safety and Calling, VHF–156.7 MHz–Channel 14–Working; VHF–156.6 MHz–Channel 12–Working. A listening watch is maintained on VHF Channel 16.

(2173) (4) In order that positive control may be maintained it is mandatory that the following procedures be followed in communicating by radio with the Black Rock Lock:

(2174) (i) Vessels desiring to enter the Black Rock Canal from either the Buffalo Outer Harbor or the Buffalo River shall call the Black Rock Lock on VHF Channel 16 or by land telephone approximately 15 minutes before the estimated time of arrival at Buffalo Harbor Traffic Lighted Bell Buoy 1 located at latitude N. 42°50.1′ and longitude W. 78°55.4′. Information to be furnished the Black Rock Lock Operator should include the name of the vessel, position, destination, length, draft (forward and aft), and the type of cargo. A second call shall be made to the lock when the vessel is abreast of the Buffalo Harbor Light on the southerly end of the detached West Breakwater. Information furnished the vessel by the Lock Operator will assure the vessel operator of the proper time to enter the Black Rock Canal with a view to safety and minimum delay.

(2175) (ii) Vessels desiring to enter the Black Rock Canal from either the Buffalo Outer Harbor or the Buffalo River shall call the Black Rock Lock on VHF Channel 16 or by land telephone to 876-5454 immediately before departing a dock and again when abreast of the North Breakwater South End Light on the southerly end of the North Breakwater.

(2176) (iii) In any radio communication from a vessel to the Black Rock Lock, the VHF (FM) frequencies will be used.

(2177) (iv) When an initial radio contact has been made with the Black Rock Lock the vessel entering the canal shall maintain a standby watch at the radio until the passage through the canal and lock is completed.

(2178) (v) Failure to comply with the foregoing procedures could result in considerable delay to a vessel and possibly in a collision between vessels in the restricted section of the canal.

(2179) (m) Black Rock Lock: All vessels and boats desiring to use the lock shall signal by two long and two short whistle blasts.

(2180) (1) Northbound vessels and boats shall not be brought to within less than 300 feet of the upper lock gates, nor shall southbound vessels be brought to within less than 200 feet of the lower lock gates, until the lock is made ready and the lockmaster in charge signals the vessel to enter the lock.

(2181) (2) Vessels and boats shall not moor to the approach walls of the lock at either end, for any other purpose than waiting for lockage, except by direction or permission of the lockmaster.

(2182) (3) Commercial vessels will receive preference in passage through the locks. Small vessels such as row, sail, and motor boats, bent on pleasure only, will be passed through the lock in company with commercial vessels when small vessels can be safely accommodated or in the absence of commercial vessels may be passed through the lock individually or together in one lockage on the hour if northbound, and on the half hour if southbound. However, commercial vessels will receive preference which could delay the passage of pleasure craft. Pleasure craft will not be permitted to pass through the lock with vessels carrying inflammable cargo. Vessels and other large boats when in the lock shall fasten one head line and one spring line to the snubbing posts on the lock walls, and the lines shall not be cast off until the signal is given by the lockmaster for the boats to leave the lock.

(2183) (4) Vessels and boats will be passed through the lock in order of their arrival except that the lockmaster may order a small vessel to lock through in company with another vessel, irrespective of the former's order of arrival.

(2184) (5) All vessels and boats shall be maneuvered with great care so as not to strike any part of the lock walls, or any gate or appurtenance thereto, or machinery for operating the gates, or the walls protecting the lock approaches.

(2185) (6) Vessels and boats shall not enter or leave until the lock gates are fully in their recesses, and the lockmaster has given direction for starting.

(2186) (7) (Reserved)

(2187) (8) Trespass on lock property is strictly prohibited. However, in that portion of the Black Rock Canal lying between the International Railway Bridge and the northerly end of the westerly lower guide pier, the following conditions shall apply to the embarking or disembarking of crew members or passengers of a vessel transiting the lock:

(2188) (i) Only the master or mate and two or three linesmen will be permitted to go ashore from transiting vessels and then only for normal operations and business incident to the transit. A maximum of only four (4) men will be permitted to go ashore from any one ship.

(2189) (ii) No crew members will be permitted to board a ship at the locks unless previously requested in writing by the master or owners, and approved by canal authorities.

(2190) (iii) No crew member may leave a ship while it is in transit in the lock or canal unless certified in advance as an emergency by the vessel master and approved by canal authorities.

(2191) (iv) No guest passengers will be permitted to either board or disembark at the canal or locks.

(2192) (9) Schedule of Seasonal Operation:

(2193) (i) March 23 through June 14–6 a.m. to 11 p.m., daily.

(2194) (ii) June 15 through September 6–24 hours, daily.

(2195) (iii) September 7 through November 30–6 a.m. to 11 p.m., daily.

(2196) (iv) December 1 through March 22–8 a.m. to 4:30 p.m., daily. During the navigation season the hours may be extended by the district engineer, depending on conditions and the need for lockage service. Public notices will be issued announcing the opening and closing dates at least 10 days in advance of such dates.

(2197) (10) Non-Operational Hours Lockings. In addition to the above schedule of operating hours, commercial vessels may be locked through during non-operational hours with prior arrangements made through the U.S. Army Engineer District Buffalo. Requests for non-operational hours lockings shall be made at least 24 hours in advance by calling (716) 876-5454, extension 2284 or by radio as described in paragraph (1) of this section, Monday through Friday, 9 a.m. to 4 p.m., except holidays. Requests shall include the approximate time of arrival and the name and call letters of the vessel or, if the vessel is not equipped to receive radio

messages, a telephone number at which messages may be received for the vessel. If a requested lockage must be delayed, prompt notification shall be given by telephone or radio.

(2198) **§207.600 Rochester (Charlotte) Harbor, N.Y.; use, administration, and navigation.**

(2199) (a) and (b) (Reserved)

(2200) (c) No vessel shall moor or anchor to any structure of the United States without the consent of the District Engineer, U.S. Army, in charge of the locality, or his authorized agent.

(2201) (d) No vessel shall moor or anchor in or along any improved channel or basin in such manner as to interfere with improvement or maintenance operations therein. Whenever in the opinion of the District Engineer any vessel is so moored or anchored, the owner thereof shall cause said vessel to be moved upon notification from and within the time specified by said District Engineer.

(2202) **§207.610 St. Lawrence River, Cape Vincent Harbor, N.Y.; use, administration, and navigation of the harbor and United States breakwater.**

(2203) (a) through (c) (Reserved)

(2204) (d) Vessels shall observe the following rule in mooring to the breakwater: The first self-propelled vessel stopping at the harbor for shelter will proceed to the upstream end of the breakwater and moor along either side of it. All similar vessels entering later will place themselves in a compact position close to those preceding them. Passenger vessels will, in general, have preference as to location of moorage. Sailing craft will so locate themselves that they will not lie in the way of other vessels entering the harbor. All vessels of every description will place themselves so as not to interfere with any work of reconstruction or repair that may be in progress at the time.

(2205) (e) The use of chains in making fast to the breakwater is prohibited. Lines must be attached to the snubbing posts only, and outboard anchors taken in.

(2206) (f) Vessels with other craft in tow will, if practicable, at once, moor them compactly along the breakwater, either taking in the towlines or placing the slack in them upon the breakwater in such a manner as not to interfere with other vessels. If necessary to moor alongside of other vessels moored to the breakwater, the towlines shall be taken in or disposed of in such a manner as not to interfere with the departure of vessels moored between them and the breakwater.

(2207) (g) Vessels of every description mooring to the breakwater, must place suitable fenders between themselves and the breakwater to protect the timber walings on the breakwater from damage.

(2208) (h) The unloading of freight of any class upon the breakwater is expressly prohibited, except in accordance with special permission from the said District Engineer or his representative.

(2209) (i) Each and every vessel made fast to the breakwater, or anchored in the harbor without a line made fast to the shore or shore dock, must have at least one experienced person upon it during the entire time said vessel is thus moored in the harbor.

(2210) **§207.800 Collection of navigation statistics.**

(2211) (a) Definitions. For the purpose of this regulation the following terms are defined:

(2212) (1) Navigable waters of the United States means those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water mark, and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. (See 33 CFR part 329 for a more complete definition of this term.)

(2213) (2) Offenses and Violations mean:

(2214) (i) Failure to submit a required report.

(2215) (ii) Failure to provide a timely, accurate, and complete report.

(2216) (iii) Failure to submit monthly listings of idle vessels or vessels in transit.

(2217) (iv) Failure to submit a report required by the lockmaster or canal operator.

(2218) (3) Leased or chartered vessel means a vessel that is leased or chartered when the owner relinquishes control of the vessel through a contractual agreement with a second party for a specified period of time and/or for a specified remuneration from the lessee. Commercial movements on an affreightment basis are not considered a lease or charter of a particular vessel.

(2219) (4) Person or entity means an individual, corporation, partnership, or company.

(2220) (5) Timely means vessel and commodity movement data must be received by the Waterborne Commerce Statistics Center within 30 days after the close of the month in which the vessel movement or nonmovement takes place.

(2221) (6) Commercial vessel means a vessel used in transporting by water, either merchandise or passengers for compensation or hire, or in the course of business of the owner, lessee, or operator of the vessel.

(2222) (7) Reporting situation means a vessel movement by an operator that is required to be reported. Typical examples are listed in the instructions on the various ENG Forms. Five typical movements that are required to be reported by vessel operating companies include the following examples:Company A is the barge owner, and the barge transports corn from Minneapolis, MN to New Orleans, LA, with fleeting at Cairo, IL.

(2223) (i) Lease/Charter: If Company A leases or charters the barge to Company B, then Company B is responsible for reporting the movements of the barge until the lease/charter expires.

(2224) (ii) Interline Movement: A barge is towed from Minneapolis to Cairo by Company A, and from Cairo to New Orleans by Company B. Since Company A is the barge owner, and the barge is not leased. Company A reports the entire movement of the barge with an origin of Minneapolis and a destination of New Orleans.

(2225) (iii) Vessel Swap/Trade: Company A swaps barge with Company B to allow Company B to meet a delivery commitment to New Orleans. Since Company A has not leased/chartered the barge, Company A is responsible for filing the report. Company B is responsible for filing the report on the barge which is traded to Company A. The swap or trade will not affect the primary responsibility for reporting the individual vessel movements.

(2226) (iv) Re-Consignment: Barge is reconsigned to Mobile, AL. Company A reports the movements as originating in Minneapolis and terminating in Mobile. The point from which barge is reconsigned is not reported, only points of loading and unloading.

(2227) (v) Fleeting: Barge is deposited at a New Orleans fleeting area by Company A and towed by Company B from fleeting area to New Orleans area dock for unloading. Company A, as barge owner, reports entire movements from Minneapolis to the unloading dock in New Orleans. Company B does not report any barge movement.

(2228) (b) Implementation of the waterborne commerce statistics provisions of the River and Harbor Act of 1922, as amended by the Water Resources Development Act of 1986 (Pub. L. 99-662), mandates the following.

(2229) (1) Filing Requirements. Except as provided in paragraph (b)(2) of this section, the person or entity receiving remuneration for the movement of vessels or for the transportation of

goods or passengers on the navigable waters is responsible for assuring that the activity report of commercial vessels is timely filed.

(2230) (i) For vessels under lease/charter agreements, the lessee or charterer of any commercial vessel engaged in commercial transportation will be responsible for the filing of said reports until the lease/charter expires.

(2231) (ii) The vessel owner, or his designated agent, is always the responsible party for ensuring that all commercial activity of the vessel is timely reported.

(2232) (2) The following Vessel Information Reports are to be filed with the Army Corps of Engineers, at the address specified on the ENG Form, and are to include:

(2233) (i) Monthly Reports. These reports shall be made on ENG Forms furnished upon written request of the vessel operating companies to the Army Corps of Engineers. The forms are available at the following address: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, Post Office Box 62180, New Orleans, Louisiana 70161-1280.

(2234) (A) All movements of domestic waterborne commercial vessels shall be reported, including but not limited to: Dry cargo ship and tanker moves, loaded and empty barge moves, towboat moves, with or without barges in tow, fishing vessels, movements of crew boats and supply boats to offshore locations, tugboat moves and movements of newly constructed vessels from the shipyard to the point of delivery.

(2235) (B) Vessels idle during the month must also be reported.

(2236) (C) Notwithstanding the above requirements, the following waterborne vessel movements need not be reported:

(2237) (1) Movements of recreational vessels.

(2238) (2) Movements of fire, police, and patrol vessels.

(2239) (3) Movements of vessels exclusively engaged in construction (e.g., piledrivers and crane barges). Note: however, that movements of supplies, materials, and crews to or from the construction site must be timely reported.

(2240) (4) Movements of dredges to or from the dredging site. However, vessel movements of dredged material from the dredging site to the disposal site must be reported.

(2241) (5) Specific movements granted exemption in writing by the Waterborne Commerce Statistics Center.

(2242) (D) ENG Forms 3925 and 3925b shall be completed and filed by vessel operating companies each month for all voyages or vessel movements completed during the month. Vessels that did not complete a move during the month shall be reported as idle or in transit.

(2243) (E) The vessel operating company may request a waiver from the Army Corps of Engineers, and upon written approval by the Waterborne Commerce Center, the company may be allowed to provide the requisite information of the above paragraph (D), on computer printouts, magnetic tape, diskettes, or alternate medium approved by the Center.

(2244) (F) Harbor Maintenance Tax information is required on ENG Form 3925 for cargo movements into or out of ports that are subject to the provisions of section 1402 of the Water Resources Development Act of 1986 (Pub. L. 99-662).

(2245) (1) The name of the shipper of the commodity, and the shipper's Internal Revenue Service number or Social Security number, must be reported on the form.

(2246) (2) If a specific exemption applies to the shipper, the shipper should list the appropriate exemption code. The specific exemption codes are listed in the directions for ENG Form 3925.

(2247) (3) Refer to 19 CFR part 24 for detailed information on exemptions and ports subject to the Harbor Maintenance Tax.

(2248) (ii) Annual Reports. Annually an inventory of vessels available for commercial carriage of domestic commerce and vessel characteristics must be filed on ENG Forms 3931 and 3932.

(2249) (iii) Transaction Reports. The sale, charter, or lease of vessels to other companies must also be reported to assure that proper decisions are made regarding each company's duty for reporting vessel movements during the year. In the absence of notification of the transaction, the former company of record remains responsible until proper notice is received by the Corps.

(2250) (iv) Reports to Lockmasters and Canal Operators. Masters of self-propelled non-recreational vessels which pass through locks and canals operated by the Army Corps of Engineers will provide the data specified on ENG Forms 3102b, 3102c, and/or 3102d to the lockmaster, canal operator, or his designated representative in the manner and detail dictated.

(2251) (c) Penalties for Noncompliance. The following penalties for noncompliance can be assessed for offenses and violations.

(2252) (1) Criminal Penalties. Every person or persons violating the provisions of this regulation shall, for each and every offenses, be liable to a fine of not more than $5,000, or imprisonment not exceeding two months, to be enforced in any district court in the United States within whose territorial jurisdiction such offense may have been committed.

(2253) (2) Civil Penalties. In addition, any person or entity that fails to provide timely, accurate, and complete statements or reports required to be submitted by this regulation may also be assessed a civil penalty of up to $2,500 per violation under 33 U.S.C. 555, as amended.

(2254) (3) Denial of Passage. In addition to these fines, penalties, and imprisonments, the lockmaster or canal operator can refuse to allow vessel passage.

(2255) (d) Enforcement Policy. Every means at the disposal of the Army Corps of Engineers will be utilized to monitor and enforce these regulations.

(2256) (1) To identify vessel operating companies that should be reporting waterborne commerce data, The Corps will make use of, but is not limited to, the following sources.

(2257) (i) Data on purchase and sale of vessels.

(2258) (ii) U.S. Coast Guard vessel documentation and reports.

(2259) (iii) Data collected at Locks, Canals, and other facilities operated by the Corps.

(2260) (iv) Data provided by terminals on ENG Form 3926.

(2261) (v) Data provided by the other Federal agencies including the Internal Revenue Service, Customs Service, Maritime Administration, Department of Transportation, and Department of Commerce.

(2262) (vi) Data provided by ports, local facilities, and State or local governments.

(2263) (vii) Data from trade journals and publications.

(2264) (viii) Site visits and inspections.

(2265) (2) Notice of Violation. Once a reporting violation is determined to have occurred, the Chief of the Waterborne Commerce Statistics Center will notify the responsible party and allow 30 days for the reports to be filed after the fact. If the reports are not filed within this 30-day notice period, then appropriate civil or criminal actions will be undertaken by the Army Corps of Engineers, including the proposal of civil or criminal penalties for noncompliance. Typical cases for criminal or civil action include, but are not limited to, those violations which are willful, repeated, or have a substantial impact in the opinion of the Chief of the Waterborne Commerce Statistics Center.

(2266) (3) Administrative Assessment of Civil Penalties. Civil penalties may be assessed in the following manner.

(2267) (i) Authorization. If the Chief of the Waterborne Commerce Statistics Center finds that a person or entity has failed to comply with any of the provisions specified herein, he is authorized to assess a civil penalty in accordance with the Class I penalty provisions of 33 CFR part 326. Provided, however, that the procedures in 33 CFR part 326 specifically implementing the Clean Water Act (33 U.S.C. 1319(g)(4)), public notice, comment period, and state coordination, shall not apply.

(2268) (ii) Initiation. The Chief of the Waterborne Commerce Statistics Center will prepare and process a proposed civil penalty order which shall state the amount of the penalty to be assessed, described by reasonable specificity the nature of the violation, and indicate the applicable provisions of 33 CFR part 326.

(2269) (iii) Hearing Requests. Recipients of a proposed civil penalty order may file a written request for a hearing or other proceeding. This request shall be as specified in 33 CFR part 326 and shall be addressed to the Director of the Water Resources Support Center, Casey Building, Fort Belvoir, Virginia 22060-5586, who will provide the requesting person or entity with a reasonable opportunity to present evidence regarding the issuance, modification, or revocation of the proposed order. Thereafter, the Director of the Water Resources Center shall issue a final order.

(2270) (4) Additional Remedies. Appropriate cases may also be referred to the local U.S. Attorney for prosecution, penalty collection, injunctive, and other relief by the Chief of the Waterborne Commerce Statistics Center.

## Part 334–Danger Zones and Restricted Area Regulations

(2271) **§334.1 Purpose.**

(2272) The purpose of this part is to:

(2273) (a) Prescribe procedures for establishing, amending and disestablishing danger zones and restricted area;

(2274) (b) List the specific danger zones and restricted areas and their boundaries; and

(2275) (c) Prescribe specific requirements, access limitations and controlled activities within the danger zones and restricted areas.

(2276) **§334.2 Definitions.**

(2277) (a) Danger zone. A defined water area (or areas) used for target practice, bombing, rocket firing or other especially hazardous operations, normally for the armed forces. The danger zones may be closed to the public on a full-time or intermittent basis, as stated in the regulations.

(2278) (b) Restricted area. A defined water area for the purpose of prohibiting or limiting public access to the area. Restricted areas generally provide security for Government property and/or protection to the public from the risks of damage or injury arising from the Government's use of that area.

(2279) **§334.3 Special policies.**

(2280) (a) General. The general regulatory policies stated in 33 CFR part 320 will be followed as appropriate. In addition, danger zone and restricted area regulations shall provide for public access to the area to the maximum extent practicable.

(2281) (b) Food fishing industry. The authority to prescribe danger zone and restricted area regulations must be exercised so as not to unreasonably interfere with or restrict the food fishing industry. Whenever the proposed establishment of a danger zone or restricted area may affect fishing operations, the District Engineer will consult with the Regional Director, U.S. Fish and Wildlife Service, Department of the Interior and the Regional Director, National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA),

(2282) (c) Temporary, occasional or intermittent use. If the use of the water area is desired for a short period of time, not exceed thirty days in duration, and that planned operations can be conducted safely without imposing unreasonable restrictions on navigation, and without promulgating restricted area regulations in accordance with the regulations in this section, applicants may be informed that formal regulations are not required. Activities of this type shall not reoccur more often than biennially (every other year), unless danger zone/restricted area rules are promulgated under this Part. Proper notices for mariners requesting that vessels avoid the area will be issued by the Agency requesting such use of the water area, or if appropriate, by the District Engineer, to all known interested persons. Copies will also be sent to appropriate State agencies, the Commandant, U.S. Coast Guard, Washington, DC 20590, and Director, National Imagery and Mapping Agency, Hydrographic Center, Washington, DC 20390, ATTN: Code NS 12. Notification to all parties and Agencies shall be made at least two weeks prior to the planned event, or earlier, if required for distribution of Local Notice to Mariners by the Coast Guard.

(2283) **§334.4 Establishment and amendment procedures.**

(2284) (a) Application. Any request for the establishment, amendment or revocation of a danger zone or restricted area must contain sufficient information for the District Engineer to issue a public notice, and as a minimum must contain the following:

(2285) (1) Name, address and telephone number of requestor including the identity of the command and DoD facility and the identity of a point of contact with phone number.

(2286) (2) Name of waterway and if a small tributary, the name of a larger connecting waterbody.

(2287) (3) Name of closest city or town, county/parish and state.

(2288) (4) Location of proposed or existing danger zone or restricted area with a map showing the location, if possible.

(2289) (5) A brief statement of the need for the area, its intended use and detailed description of the times, dates and extent of restriction.

(2290) (b) Public notice. (1) The Corps will normally publish public notices and **Federal Register** documents concurrently. Upon receipt of a request for the establishment, amendment or revocation of a danger zone or restricted area, the District Engineer should forward a copy of the request with his/her recommendation, a copy of the draft public notice and a draft **Federal Register** document to the Office of the Chief of Engineers, ATTN: CECW-OR. The Chief of Engineers will publish the proposal in the **Federal Register** concurrent with the public notice issued by the District Engineer.

(2291) (2) Content. The public notice and **Federal Register** documents must include sufficient information to give a clear understanding of the proposed action and should include the following items of information:

(2292) (i) Applicable statutory authority or authorities; (40 Stat. 266; 33 U.S.C. 1) and (40 Stat. 892; 33 U.S.C. 3)

(2293) (ii) A reasonable comment period. The public notice should fix a limiting date within which comments will be received, normally a period not less than 30 days after publication of the notice.

(2294) (iii) The address of the District Engineer as the recipient of any comments received.

(2295) (iv) The identity of the applicant/proponent;

(2296) (v) The name or title, address and telephone number of the Corps employee from whom additional information concerning the proposal may be obtained;

(2297) (vi) The location of the proposed activity accompanied by a map of sufficient detail to show the boundaries of the area(s) and its relationship to the surrounding area.

(2298) (3) Distribution. Public notice will be distributed in accordance with 33 CFR 325.3(d)(1). In addition to this general distribution, public notices will be sent to the following Agencies:

(2299) (i) The Federal Aviation Administration (FAA) where the use of airspace is involved.

(2300) (ii) The Commander, Service Force, U.S. Atlantic Fleet, if a proposed action involves a danger zone off the U.S. Atlantic coast.

(2301) (iii) Proposed danger zones on the U.S. Pacific coast must be coordinated with the applicable commands as follows:

(2302) Alaska, Oregon and Washington:

(2303) Commander, Naval Base, Seattle

(2304) California:

(2305) Commander, Naval Base, San Diego

(2306) Hawaii and Trust Territories:

(2307) Commander, Naval Base, Pearl Harbor

(2308) (c) Public hearing. The District Engineer may conduct a public hearing in accordance with 33 CFR part 327.

(2309) (d) Environmental documentation. The District Engineer shall prepare environmental documentation in accordance with appendix B to 33 CFR part 325.

(2310) (e) District Engineer's recommendation. After closure of the comment period, and upon completion of the District Engineer's review he/she shall forward the case through channels to the Office of the Chief of Engineers, ATTN: CECW-OR with a recommendation of whether or not the danger zone or restricted area regulation should be promulgated. The District Engineer shall include a copy of environmental documentation prepared in accordance with appendix B to 33 CFR part 325, the record of any public hearings, if held, a summary of any comments received and a response thereto, and a draft of the regulation as it is to appear in the **Federal Register.**

(2311) (f) Final decision. The Chief of Engineers will notify the District Engineer of the final decision to either approve or disapprove the regulations. The District Engineer will notify the applicant/proponent and publish a public notice of the final decision. Concurrent with issuance of the public notice the Office of the Chief of Engineers will publish the final decision in the **Federal Register** and either withdraw the proposed regulation or issue the final regulation as appropriate. The final rule shall become effective no sooner than 30 days after publication in the **Federal Register** unless the Chief of Engineers finds that sufficient cause exists and publishes that rationale with the regulations.

(2312) **§334.5 Disestablishment of a danger zone.**

(2313) (a) Upon receipt of a request from any agency for the disestablishment of a danger zone, the District Engineer shall notify that agency of its responsibility for returning the area to a condition suitable for use by the public. The agency must either certify that it has not used the area for a purpose that requires cleanup or that it has removed all hazardous materials and munitions, before the Corps will disestablish the area. The agency will remain responsible for the enforcement of the danger zone regulations to prevent unauthorized entry into the area until the area is deemed safe for use by the public and the area is disestablished by the Corps.

(2314) (b) Upon receipt of the certification required in paragraph (a) of this section, the District shall forward the request for disestablishment of the danger zone through channels to CECW-OR, with its recommendations. Notice of proposed rulemaking and public procedures as outlined in §334.4 are not normally required before publication of the final rule revoking a restricted area or danger zone regulation. The disestablishment/revocation of the danger zone or restricted area regulation removes a restriction on a waterway.

(2315) **§334.6 Datum.**

(2316) (a) Geographic coordinates expressed in terms of latitude or longitude, or both, are not intended for plotting on maps or charts whose reference horizontal datum is the North American Datum of 1983 (NAD 83), unless such geographic coordinates are expressly labeled NAD 83. Geographic coordinates without the NAD 83 reference may be plotted on maps or charts referenced to NAD 83 only after application of the appropriate corrections that are published on the particular map or chart being used.

(2317) (b) For further information on NAD 83 and National Service nautical charts please contact: Director, Coast Survey (N/CS), National Ocean Service, NOAA, 1315 East-West Highway, Station 6417, Silver Spring, MD 20910-3282.

(2318) **§334.820 Lake Michigan; naval restricted area, United States Naval Training Center, Great Lakes, Ill.**

(2319) (a) The area. An area extending in a north and south direction from the Great Lakes, Illinois, south breakwater to an east-west line projecting eastward from the shore termination of the north fence of the United States Naval Training Center, Great Lakes, Illinois, and extending into Lake Michigan for a distance of one mile from the shoreline.

(2320) (b) *The regulations.* No person or vessel of any kind, except those engaged in naval operations, shall enter, navigate, anchor, or moor in the restricted area without first obtaining permission to do so from the Commander, U.S. Naval Training Center, Great Lakes, Illinois, or his authorized representative.

(2321) **§334.830 Lake Michigan; small-arms range adjacent to United States Naval Training Center, Great Lakes, Ill.**

(2322) (a) The danger zone. An area bounded on the north by latitude 42°20′30″; on the east by longitude 87°47′30″; on the south by latitude 42°18′45″; and on the west by the shoreline.

(2323) (b) The regulations. (1) When firing affecting the danger zone is in progress, the enforcing agency will post guards at such locations that the waters in the danger zone may be observed and arrange signals whereby these guards may stop the firing should any person or vessel be seen in the waters of the danger zone. When firing is in progress, the enforcing agency will cause red flags to be displayed on shore near the rifle butts, which may be readily discernible to a person in a vessel within the danger zone.

(2324) (2) The enforcing agency is hereby authorized to use such agencies as shall be necessary to prohibit all persons and vessels from entering the area until such time as shall be convenient.

(2325) (3) If such flags are displayed it will indicate that firing is in progress, and that the waters in the danger zone are subject to impact by rounds missing or richocheting off the impact berm and should not be entered until the flags are lowered.

(2326) (4) Wherever possible, the enforcing agency will warn the public of the contemplated times of firing and the areas involved two days in advance of the scheduled date, through the public press and the United States Coast Guard. The danger zone may, however, be closed without advance notice.

(2327) (5) (Revoked)

(2328) (6) The regulations in this section shall be enforced by the Commander, United States Naval Training Center, Great Lakes, Illinois, and such agencies as he may designate.

(2329) **§334.840 Waters of Lake Michigan south of Northerly Island at entrance to Burnham Park Yacht Harbor, Chicago, Illinois; danger zone adjacent to airport on Northerly Island.**

(2330) (1) Danger Zone–(1) Zone A. Beginning at a point 250 feet west of the center line of the runway at the south end of the air strip on Northerly Island; thence 183°, 500 feet; thence 090°, 600 feet; and thence northerly to a point 250 feet east of the center line of the runway at the south end of said air strip. During the navigation season, the southeast and southwest corners of Zone A will be marked with spar buoys colored and lettered as prescribed by the United States Coast Guard.

(2331) (2) Zone B. Beginning at the southwest corner of Zone A; thence 183°, 500 feet; thence 090°, 700 feet; thence northerly to the southeast corner of Zone A; and thence 270° to the point of beginning. During the navigation season, the southeast and southwest corners of Zone B will be marked with spar buoys colored and lettered as prescribed by the United State Coast Guard.

(2332) (b) Regulations. (1) During daylight hours (from one-half hour before sunrise to one-half hour after sunset), and when the airport on Northerly Island is in operation, no vessel or other watercraft any part of which extends more than 15 feet above the water surface shall enter or remain in Zone A, and no vessel or other watercraft any part of which extends 30 feet or more above the water surface shall enter or remain in Zone B.

(2333) (2) When the airport is in operation a red ball, at least three feet in diameter, shall be continuously displayed at the northeast and northwest corners of Zone A. These balls shall not be displayed when the airport is not in operation.

(2334) **§334.850 Lake Erie, west end, north of Erie Ordnance Depot, Lacarne, Ohio.**

(2335) (a) The danger zone: Consists of the waters of Lake Erie within:

(2336) (1) Danger Area I. The sector of a circle with a radius of 6,500 yards centered at latitude 41°32′30″N., longitude 83°01′00″W., and intersecting the southwest boundary of Area II at latitude 41°35′00″N., longitude 83°03′22″W., and the southeast boundary of Area II at latitude 41°34′20″N., longitude 82°57′10″W.

(2337) (2) Danger Area II (Includes Area I). The area bounded as follows: Begining at

(2338) 41°32′30″N., 83°01′00″W.; thence to

(2339) 41°35′00″N., 83°03′22″W., thence to

(2340) 41°36′00″N., 83°03′24″W.; thence to

(2341) 41°41′30″N., 83°07′30″W.; thence to

(2342) 41°41′30″N., 83°00′00″W.; thence to

(2343) 41°35′40″N., 82°54′50″W.; and thence to the point of beginning.

(2344) (b) Types of firing:

(2345) (1) Danger Area I. Small arms impact area.

(2346) (2) Danger Area II. Ground-based artillery, anti-aircraft artillery and automatic weapons impact area.

(2347) (c) Authorized dates and hours of firing:

(2348) (1) Danger Area I. 6 a.m. to 6 p.m., e.s.t./e.d.t., daily; actual firing dates and hours within the authorized period to be announced in advance in special firing notices.

(2349) (2) Danger Area II. 8 a.m. to 5 p.m., e.s.t./e.d.t., daily except on Saturdays, Sundays, and holidays; actual firing dates and hours scheduled within authorized period to be announced in advance in special firing notices.

(2350) (d) Restrictions:

(2351) (1) No person or vessel shall enter or remain in a danger zone during a scheduled firing period announced in a special firing notice unless specific permission is granted in each instance by a representative of the enforcing officer.

(2352) (2) The danger areas within the danger zone shall be open to the public for navigation, fishing and other public use when firing and/or bombing is not scheduled.

(2353) (e) Enforcing agencies: The regulations in this section shall be enforced for the respective danger areas by the following commanders and such agencies as each may designate for his assigned areas. He will be responsible for providing the prescribed control, signals, and special firing notices.

(2354) (1) Danger Area I. Adjutant General, State of Ohio.

(2355) (2) Danger Area II. Adjutant General, State of Ohio.

(2356) (f) Control and signals:

(2357) (1) Danger Area I: When firing into Area I, red flags will be flown from the safety tower at Camp Perry, and from flag poles in the butts of the ranges being used.

(2358) (2) Danger Area II: During all types of firing into Area II, red flags will be displayed, one from the safety tower at Camp Perry and one from the safety tower at the Proof Facility at the Erie Industrial Park (Erie Proof Front). During firing into Area II, patrol boats will police and maintain surveillance of the area, and will be in constant radio communication with the shore station controlling the firing.

(2359) (3) (Reserved)

(2360) (4) The appropriate enforcing officer has authority to suspend any scheduled firing for reasonable periods during regattas and immediately after fishing nets are destroyed or dislocated by severe storms.

(2361) (5) The special firing notices which will include schedules of use will be published by the enforcing officer indicated in paragraph (e) of this section, in sufficient time to permit circularization to interested parties and posting on the bulletin boards of post offices in surrounding localities. Special notices will also be furnished the District Engineer, Corps of Engineers, Detroit, Mich.; the Commander, Ninth Coast Guard District, Cleveland, Ohio; the Regional Manager, Federal Aviation Administration, Chicago, Ill.; and each of the enforcing agencies listed in paragraph (e) of this section. Users of the waterway shall familiarize themselves with the current special firing notices. If in doubt, inquiry should be made to the enforcing officer indicated in paragraph (e) of this section.

(2362) (6) Agencies desiring to use the areas shall present their requirements to the respective enforcing officer who is responsible for, and is granted authority to, coordinate the firing and established priorities, for the using agencies.

(2363) (g) Fishing permits: Fishermen desiring to set fixed nets within the danger zone are required in every instance to have written permits. Permits for placing nets within Areas I and II may be obtained by written application to the Adjutant General, State of Ohio. Applicants for permits must state the location at which they desire to set fixed nets and the period of time which they desire the permit to cover.

(2364) (h) Injurious chemicals: No phosphorus or other poisonous chemicals injurious to wild fowl or fish will be discharged into the waters of the areas.

(2365) (i) The regulations in this section shall be revised annually by the Department of the Army to determine whether further limitations of the danger zone shall be considered.

**Part 401–Seaway Regulations and Rules**

(2366) **Note.**–Regulations of this Part (33 CFR 401) are not contained in this Coast Pilot but are contained in the Seaway Handbook, issued jointly by and available from The Saint Lawrence Seaway Development Corporation and The St. Lawrence Seaway

Authority. (See St. Lawrence Seaway, chapter 3, and appendix for addresses.)

(2367) **Title 36–Parks, Forests, and Public Property**

## PART 1-GENERAL PROVISIONS

(2368) **§1.1 Purpose.**

(2369) (a) The regulations in this chapter provide for the proper use, management, government, and protection of persons, property, and natural and cultural resources within areas under the jurisdiction of the National Park Service.

(2370) (b) These regulations will be utilized to fulfill the statutory purposes of units of the National Park System: to conserve scenery, natural and historic objects, and wildlife, and to provide for the enjoyment of those resources in a manner that will leave them unimpaired for the enjoyment of future generations.

(2371) **§1.2 Applicability and scope.**

(2372) (a) The regulations contained in this chapter apply to all persons entering, using, visiting or otherwise within:

(2373) (1) The boundaries of federally owned lands and waters administered by or subject to the jurisdiction of the National Park Service; or

(2374) (2) The boundaries of lands and waters, controlled, leased, administered or otherwise subject to the jurisdiction of the National Park Service, including other Federal reservations in the environs of the District of Columbia, policed with the approval or concurrence of the head of the agency having jurisdiction or control over such reservations, pursuant to the provisions of the Act of March 17, 1948 (62 Stat. 81); or

(2375) (3) Less-than-fee interests to the extent necessary to fulfill the purpose of the acquired Federal interest and compatible with the retained nonfederal interest.

(2376) (b) Except for regulations containing provisions that are specifically applicable, regardless of land ownership, on lands and waters within a park area that are under the legislative jurisdiction of the United States, the regulations contained in Parts 1 through 5 and Part 7 of this Title do not apply on non-federally owned lands and waters or on Indian lands and waters owned individually or tribally within the boundaries of a park area.

(2377) (c) The regulations contained in Part 7 and Part 13 of this Title are special regulations prescribed for specific park areas. Those regulations may amend, modify, relax or make more stringent the regulations contained in Parts 1 through 5 and Part 12 of this Title.

(2378) (d) The regulations contained in Parts 2 through 5 and Part 7 shall not be construed to prohibit administrative activities conducted by the National Park Service, or its agents, in accordance with approved general management and resources management plans, or in emergency operations involving threats of life, property, or park resources.

(2379) (e) The regulations in this chapter are intended to treat a mobility-impaired person using a manual or motorized wheelchair as a pedestrian, and are not intended to restrict the activities of such a person beyond the degree that the activities of a pedestrian are restricted by the same regulations.

## PART 2–Resource Protection, Public Use and Recreation (in part)

(2380) **§2.15 Pets.**

(2381) (a) The following are prohibited:

(2382) (1) Possessing a pet in a public building, public transportation vehicle, or location designated as a swimming beach, or any structure or area closed to the possession of pets by the superintendent. This subparagraph shall not apply to guide dogs accompanying visually impaired persons or hearing ear dogs accompanying hearing-impaired persons.

(2383) (2) Failing to crate, cage, restrain on a leash which shall not exceed six feet in length, or otherwise physically confine a pet at all times.

(2384) (3) Leaving a pet unattended and tied to an object, except in designated areas or under conditions which may be established by the superintendent.

(2385) (4) Allowing a pet to make noise that is unreasonable considering location, time of day or night, impact on park users, and other relevant factors, or that frightens wildlife by barking, howling, or making other noise.

(2386) (5) Failing to comply with pet excrement disposal conditions which may be established by the superintendent.

(2387) (b) In park areas where hunting is allowed, dogs may be used in support of these activities in accordance with applicable Federal and State laws and in accordance with conditions which may be established by the superintendent.

(2388) (c) Pets or feral animals that are running-at-large and observed by an authorized person in the act of killing, injuring or molesting humans, live-stock, or wildlife may be destroyed if necessary for public safety or protection of wildlife, livestock, or other park resources.

(2389) (d) Pets running-at-large may be impounded, and the owner may be charged reasonable fees for kennel or boarding costs, feed, veterinarian fees, transportation costs, and disposal. An impounded pet may be put up for adoption or otherwise disposed of after being held for 72 hours from the time the owner was notified of capture or 72 hours from the time of capture if the owner is unknown.

(2390) (e) Pets may be kept by residents of park areas consistent with the provisions of this section and in accordance with conditions which may be established by the superintendent. Violation of these conditions is prohibited.

(2391) (f) This section does not apply to dogs used by authorized Federal, State and local law enforcement officers in the performance of their official duties.

## Part 7–Special Regulations, Areas of the National Park System

(2392) **§7.38 Isle Royale National Park.**

(2393) (a) Aircraft, designated landing areas.

(2394) (1) The portion of Tobin Harbor located in the NE¼ of sec. 4, T. 66 N., R. 33 W.; the SE¼ of sec. 33, T. 67 N., R. 33 W., and the SW¼ of sec. 34, T. 67 N., R. 33 W.

(2395) (2) The portion of Rock Harbor located in the SE¼ of sec. 13, the N½ of sec. 24, T. 66 N., R. 34 W., and the W½ of sec. 18, T. 66 N., R. 33 W.

(2396) (3) The portion of Washington Harbor located in the N½ of sec. 32, all of sec. 29, SE¼ of sec. 30, and the E½ of sec. 31, T. 64 N., R. 38 W.

(2397) (b) Underwater diving. No person shall undertake diving in the waters of Isle Royale National Park with the aid of underwater breathing apparatus without first registering with the Superintendent.

(2398) (c) Mammals. Dogs, cats, and other mammals may not be brought into or possessed in the park area, except for guide dogs accompanying the blind.

(2399) **Title 40–Protection of Environment**

**Part 140–Marine Sanitation Device Standard**

**Standards of Performance**

(2400) Initial standards and regulations promulgated under section 13 of the Act preempt any statute or regulation of a State or political subdivision with respect to the design, manufacture, or installation or use of any marine sanitation device on any vessel subject to section 13. However, such preemption does not take place until the effective date of the initial standards and regulations, including the regulations to be promulgated by the Secretary of Transportation. In accordance with section 13, this regulation becomes effective for new vessels 2 years after promulgation of the regulations by the Secretary of Transportation and for existing vessels 5 years after such promulgation.

(2401) It should be noted that, in accordance with section 13 of the Act, these standards apply only to navigable waters of the United States. Many inland lakes and rivers do not connect with bodies of water used in interstate commerce and hence are not part of the navigable waters of the United States. Consequently, they are not covered by these regulations.

(2402) **§140.1 Definitions.**

(2403) For the purpose of these standards the following definitions shall apply:

(2404) (a) "Sewage" means human body wastes and the wastes from toilets and other receptacles intended to receive or retain body wastes;

(2405) (b) "Discharge" includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping;

(2406) (c) "Marine sanitation device" includes any equipment for installation on board a vessel and which is designed to receive, retain, treat, or discharge sewage, and any process to treat such sewage;

(2407) (d) "Vessel" includes every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on the navigable waters of the United States;

(2408) (e) "New vessels" refers to any vessel on which construction was initiated on or after January 30, 1975;

(2409) (f) "Existing vessel" refers to any vessel on which construction was initiated before January 30, 1975;

(2410) (g) "Fecal coliform bacteria" are those organisms associated with the intestine of warm blooded animals that are commonly used to indicate the presence of fecal material and the potential presence of organisms capable of causing human disease.

(2411) **§140.2 Scope of standard.**

(2412) The standard adopted herein applies only to vessels on which a marine sanitation device has been installed. The standard does not require the installation of a marine sanitation device on any vessel that is not so equipped. The standard applies to vessels owned and operated by the United States unless the Secretary of Defense finds that compliance would not be in the interest of national security.

(2413) **§140.3 Standard.**

(2414) (a)(1) In freshwater lakes, freshwater reservoirs or other freshwater impoundments whose inlets or outlets are such as to prevent the ingress or egress by vessel traffic subject to this regulation, or in rivers not capable of navigation by interstate vessel traffic subject to this regulations, marine sanitation devices certified by the U.S. Coast Guard (see 33 CFR Part 159, published in 40 FR 4622, January 30, 1975), installed on all vessels shall be designed and operated to prevent the overboard discharge of sewage, treated or untreated, or of any waste derived from sewage. This shall not be construed to prohibit the carriage of Coast Guard-certified flow-through treatment devices which have been secured so as to prevent such discharges.

(2415) (2) In all other waters, Coast-Guard-certified marine sanitation devices installed on all vessels shall be designed and operated to either retain, dispose of, or discharge sewage. If the device has a discharge, subject to paragraph (d) of this section, the effluent shall not have a fecal coliform bacterial count of greater than 1,000 per 100 milliliters nor visible floating solids. Waters where a Coast Guard-certified marine sanitation device permitting discharge is allowed include coastal waters and estuaries, the Great Lakes and inter-connected waterways, freshwater lakes, and impoundments accessible through locks, and other flowing waters that are navigable interstate by vessels subject to this regulation.

(2416) (b) This standard shall become effective on January 30, 1977 for new vessels and on January 30, 1980 for existing vessels (or, in the case of vessels owned and operated by the Department of Defense, two years and five years, for new and existing vessels, respectively, after promulgation of implementing regulations by the Secretary of Defense under section 312(d) of the Act).

(2417) (c) Any vessel which is equipped as of the date of promulgation of this regulation with a Coast Guard-certified flow-through marine sanitation device meeting the requirements of paragraph (a)(2) of this section, shall not be required to comply with the provisions designed to prevent the overboard discharge of sewage, treated or untreated, in paragraph (a)(1) of this section, for the operable life of that device.

(2418) (d) After January 30, 1980, subject to paragraphs (e) and (f) of this section, marine sanitation devices on all vessels on waters that are not subject to a prohibition of the overboard discharge of sewage, treated or untreated, as specified in paragraph (a)(1) of this section, shall be designed and operated to either retain, dispose of, or discharge sewage, and shall be certified by the U.S. Coast Guard. If the device has a discharge, the effluent shall not have a fecal coliform bacterial count of greater than 200 per 100 milliliters, nor suspended solids greater than 150 mg/1.

(2419) (e) Any existing vessel on waters not subject to a prohibition of the overboard discharge of sewage in paragraph (a)(1) of this section, and which is equipped with a certified device on or before January 30, 1978, shall not be required to comply with paragraph (d) of this section, for the operable life of that device.

(2420) (f) Any new vessel on waters not subject to the prohibition of the overboard discharge of sewage in paragraph (a)(1) of this section, and on which construction is initiated before January 31, 1980, which is equipped with a marine sanitation device before January 31, 1980, certified under paragraph (a)(2) of this section, shall not be required to comply with paragraph (d) of this section, for the operable life of that device.

(2421) (g) The degrees of treatment described in paragraphs (a) and (d) of this section are "appropriate standards" for purposes of Coast Guard and Department of Defense certification pursuant to section 312(g)(2) of the Act.

(2422) (h) This section is not to be construed to accelerate the effective date of the standards and regulations promulgated under section 312 as such date affects the sales regulations for marine sanitation devices specified in section 312(g)(1): January 30, 1977, and January 30, 1980, for new and existing vessels, respectively.

(2423) **§140.4 Complete prohibition.**

(2424) Prohibition pursuant to CWA section 312(f)(3): a State may completely prohibit the discharge from all vessels of any sewage, whether treated or not, into some or all of the waters within such State by making a written application to the Administrator, Environmental Protection Agency, and by receiving the Administrator's affirmative determination pursuant to section 312(f)(3) of the Act. Upon receipt of an application under section 312(f)(3) of the Act, the Administrator will determine within 90 days whether adequate facilities for the safe and sanitary removal and treatment of sewage from all vessels using such waters are reasonably available. Applications made by States pursuant to section 312(f)(3) of the Act shall include:

(2425) (1) A certification that the protection and enhancement of the waters described in the petition require greater environmental protection than the applicable Federal standard;

(2426) (2) a map showing the location of commercial and recreational pump-out facilities;

(2427) (3) a description of the location of pump-out facilities within waters designated for no discharge;

(2428) (4) the general schedule of operating hours of the pump-out facilities;

(2429) (5) the draught requirements on vessels that may be excluded because of insufficient water depth adjacent to the facility;

(2430) (6) information indicating that treatment of wastes from such pump-out facilities is in conformance with Federal law; and

(2431) (7) information on vessel population and vessel usage of the subject waters.

(2432) (b) Prohibition pursuant to CWA section 312(f)(4)(A): a State may make a written application to the Administrator, Environmental Protection Agency, under section 312(f)(4)(A) of the Act, for the issuance of a regulation completely prohibiting discharge from a vessel of any sewage, whether treated or not, into particular waters of the United States or specified portions thereof, which waters are located within the boundaries of such State. Such application shall specify with particularity the waters, or portions thereof, for which a complete prohibition is desired. The application shall include identification of water recreational areas, drinking water intakes, aquatic sanctuaries, identifiable fish-spawning and nursery areas, and areas of intensive boating activities. If, on the basis of the State's application and any other information available to him, the Administrator is unable to make a finding that the waters listed in the application require a complete prohibition of any discharge in the waters or portions thereof covered by the application, he shall state the reasons why he cannot make such a finding, and shall deny the application. If the Administrator makes a finding that the waters listed in the application require a complete prohibition of any discharge in all or any part of the waters or portions thereof covered by the State's application, he shall publish notice of such findings together with a notice of proposed rule making, and then shall proceed in accordance with 5 U.S.C. 553. If the Administrator's finding is that applicable water quality standards require a complete prohibition covering a more restricted or more expanded area than that applied for by the State, he shall state the reasons why his finding differs in scope from that requested in the State's application.

(2433) (1) For the following waters the discharge from a vessel of any sewage (whether treated or not) is completely prohibited pursuant to CWA section 312(f)(4)(A):

(2434) (i) Boundary Waters Canoe Area, formerly designated as the Superior, Little Indian Sioux, and Caribou Roadless Areas, in the Superior National Forest, Minnesota, as described in 16 U.S.C. 577-577d1.

(2435) (ii) (Reserved)

(2436) (c)(1) *Prohibition pursuant to CWA* section 312(f)(4)(B): A State may make written application to the Administrator of the Environmental Protection Agency under section 312(f)(4)(B) of the Act for the issuance of a regulation establishing a drinking water intake no discharge zone which completely prohibits discharge from a vessel of any sewage, whether treated or untreated, into that zone in particular waters, or portions thereof, within such State. Such application shall:

(2437) (i) Identify and describe exactly and in detail the location of the drinking water supply intake(s) and the community served by the intake(s), including average and maximum expected amounts of inflow;

(2438) (ii) Specify and describe exactly and in detail, the waters, or portions thereof, for which a complete prohibition is desired, and where appropriate, average, maximum and low flows in million gallons per day (MGD) or the metric equivalent;

(2439) (iii) Include a map, either a USGS topographic quadrant map or a NOAA nautical chart, as applicable, clearly marking by latitude and longitude the waters or portions thereof to be designated a drinking water intake zone; and

(2440) (iv) Include a statement of basis justifying the size of the requested drinking water intake zone, for example, identifying areas of intensive boating activities.

(2441) (2) If the Administrator finds that a complete prohibition is appropriate under this paragraph, he or she shall publish notice of such finding together with a notice of proposed rulemaking, and then shall proceed in accordance with 5 U.S.C. 553. If the Administrator's finding is that a complete prohibition covering a more restricted or more expanded area that applied for by the State is appropriate, he or she shall also include a statement of the reasons why the finding differs in scope from that requested in the State's application.

(2442) (3) If the Administrator finds that a complete prohibition is inappropriate under this paragraph, he or she shall deny the application and state the reasons for such denial.

(2443) (4) For the following waters the discharge from a vessel of any sewage, whether treated or not, is completely prohibited pursuant to CWA section 312(f)(4)(B):

(2444) (i) Two portions of the Hudson River in New York States, the first is bounded by an east-west line through the most northern confluence of the Mohawk River which will be designated by the Troy-Waterford Bridge (126th Street Bridge) on the south and Lock 2 on the north, and the second of which is bounded on the north by southern end of Houghtaling Island and on the south by a line between the Village of Roseton on the western shore and Low Point on the eastern shore in the vicinity of Chelsea, as described in Items 2 and 3 of 6 NYCRR Part 858.4.

(2445) (ii) (Reserved)

(2446) **§140.5 Analytical procedures.**

(2447) In determining the composition and quality of effluent discharged from marine sanitation devices the procedures contained in 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants," or subsequent revisions or amendments thereto, shall be employed.

(2448) **Title 46–Shipping**

**Part 401–Great Lakes Pilotage Regulations (in part)**

**Subpart A–General**

(2449) **§401.110 Definitions.**

(2450) (a) The following terms where used in this part shall have the following meanings:

(2451) (1) "Act" means the Great Lakes Pilotage Act of 1960, as amended (Public Law 86-555, 74 Stat. 259-262; 46 U.S.C. 216-216i).

(2452) (2) "Commandant" means Commandant, U.S. Coast Guard, Department of Transportation, Washington, DC 20593-0001.

(2453) (3) through (4) not carried in this Coast Pilot.

(2454) (5) "Great Lakes" means Lakes Superior, Michigan, Huron, Erie, and Ontario, their connecting and tributary waters, the St. Lawrence River as far east as Saint Regis, and adjacent port areas.

(2455) (6) through (8) not carried in this Coast Pilot.

(2456) (9) "Director" means Director, Great Lakes Pilotage. Communications with the Director may be sent to the following address: Director, Great Lakes Pilotage (G-MO), 2100 Second Street, SW, Washington, DC 20593-0001.

(2457) (10) Rate computation definitions:

(2458) (i) "Length" means the distance between the forward and after extremities of the ship.

(2459) (ii) "Breadth" means the maximum breadth to the outside of the shell plating of the ship.

(2460) (iii) "Depth" means the vertical distance at amidships from the top of the keel plate to the uppermost continuous deck, fore and aft, and which extends to the sides of the ship. The continuity of a deck shall not be considered to be affected by the existence of tonnage openings, engine spaces, or a step in the deck.

(2461) (11) "Person" includes an individual, registered pilot, partnership, corporation, association, voluntary association, authorized pool, or public or private organization, other than an agency.

(2462) (12) through (15) not carried in this Coast Pilot.

(2463) (16) "Association" means any organization that holds or held a Certificate of Authorization issued by the Director of Great Lakes Pilotage to operate a pilotage pool on the Great Lakes.

(2464) **§401.120 Federal Reservation of Pilotage Regulations.**

(2465) No state, municipal, or other local authority shall require the use of pilots or regulate any aspect of pilotage in any of the waters specified in the Act. Only those persons registered as United States Registered Pilots or Canadian Registered Pilots as defined in this subpart may render pilotage services on any vessel subject to the Act and the Memorandum of Arrangements, Great Lakes Pilotage.

**Subpart E–Penalties; Operations Without Registered Pilots**

(2466) **§401.500 Penalties for Violations.**

(2467) Any person, including a pilot, master, owner, or agent, who violates any provision of this part shall be liable to the United States for a civil penalty as set forth in 46 U.S.C. 9308.

(2468) **§401.510 Operation without Registered Pilots.**

(2469) (a) A vessel may be navigated in the U.S. waters of the Great Lakes without a United States or Canadian Registered Pilot when the vessel or its cargo is in distress or jeopardy.

(2470) (b) A vessel may be navigated in the U.S. waters of the Great Lakes without a United States or Canadian Registered Pilot when the Director, with the concurrence of the Commander, 9th Coast Guard District, notifies the master that a United States or Canadian Registered Pilot is not available.

(2471) (1) Notification to the master that a pilot is not available will be made by the Director, either directly to the vessel or through the appropriate pilotage pool, orally or in writing as the circumstances admit, and shall not be deemed given until the notice is actually received by the vessel.

(2472) (2) The determination that a pilot is not available will be made on an individual basis and only when a vessel has given proper notice of its pilotage service requirements to the pilotage pool having dispatching jurisdiction at the time. The vessel has no obligation or responsibility with respect to such notification other than properly informing the pilotage pool of its pilotage requirements. However, the failure or delay by the pool in processing a pilotage service request, or refusal or delay by the Coast Guard in notifying the vessel that a pilot is not available, does not constitute constructive notice that a pilot is not available, and the vessel is not relieved by such failure or delay from compliance with the Great Lakes Pilotage Act of 1960.

(2473) (3) Upon receipt of proper notice of a vessel's pilotage requirements, the pilotage pool shall then determine from the tour de role the availability of a pilot to render the service required. If no pilot is reasonably expected to be available for service within 6 hours of the time the pilotage services are required by the vessel, the pilotage pool shall promptly inform the Director through the U.S. Coast Guard communications system in the manner as may be prescribed from time to time by the Commandant. The Director shall be informed of:

(2474) (1) Name and flag of the vessel:

(2475) (ii) Route of vessel for which a pilot is not available;

(2476) (iii) Time elapsing before a pilot is reasonably expected to become available;

(2477) (iv) Whether vessel has an "other officer" on board;

(2478) (v) Familiarity of master with route to be transited by the vessel;

(2479) (vi) Draft of vessel; and

(2480) (vii) Any circumstance of traffic or weather, or condition of the vessel or its cargo which would adversely affect the safety of the vessel in transiting without a pilot.

(2481) (4) When a pilot is expected to become available within 6 hours of the time pilot services are required, the vessel shall be informed that a pilot is available and the approximate time the pilot will report on duty. However, should any unusual circumstance or condition exist which may justify notification that a pilot is not available in less than 6 hours, the pilotage pool shall inform the Director as in paragraph (b)(3) of this section, along with the circumstances involved. Additionally, the vesselmay contact the Director directly to request notification under paragraph (b)(1) of this section if a notice of pilot availability is not received from the appropriate pilotage pool within two hours of providing its pilotage requirements to the pool.

(2482) (5) Any vessel which requires the services of a pilot and is navigated without a pilot or proceeds prior to receipt of a message that a pilot is not available pursuant to paragraph (b)(1) of this section shall be reported as in violation of section 7 of the Great Lakes Pilotage Act of 1960 by the pilotage pool to the local Coast Guard unit having jurisdiction. If the message is received after the vessel proceeds, such message shall not be delivered without concurrence of the Coast Guard officer to whom the violation was reported.

(2483) (6) U.S. pilotage pools informing the Director that a pilot is not available for a vessel shall also obtain notice that pilot is not available from the appropriate Canadian Supervisor of Pilots for

those portions of the route which are in Canadian waters in the manner prescribed by them. The notice for Canadian District No. 1 waters shall be obtained from the Supervisor of Pilots, Department of Transport, Cornwall, Ontario, and the notice for Canadian District No. 2 waters shall be obtained from the Supervisor of Pilots, Department of Transport, Port Weller, Ontario. Authority to issue notice for Canadian waters of District No. 3 has been granted to the Director by the Department of Transport, Ottawa, and separate notice from Canada for this District is not required until such time as separate Canadian pilotage dispatch facilities may be established.

(2484) (7) Notice that a pilot is not available shall not be delivered to any vessel unless the message contains the concurrence of the Commander, 9th Coast Guard District, and notice for Canadian waters of Districts No. 1 and No. 2, if required, has been obtained from the appropriate Canadian authority.

(2485) (8) In the event of an emergency or any other compelling circumstance, the Director may issue, without the specific request for service as provided under paragraph (b)(2) of this section, individual or general notification that a pilot or pilots are not available. Pilotage pools shall advise the Director of any condition or circumstance coming to their attention which may warrant such a determination.

(2486) **Title 47–Telecommunication**

**Part 80–Stations in the Maritime Services**

**Subpart G–Safely Watch Requirements and Procedures (in part)**

(2487) **§80.308 Watch required by the Great Lakes Radio Agreement.**

(2488) (a) Each ship of the United States that is equipped with a radiotelephone station for compliance with the Great Lakes Radio Agreement must when underway keep a watch on:

(2489) (1) 156.800 MHz on board a vessel 20 meters (65 feet) and over in length, a vessel engaged in towing (See §80.951(b)), or a vessel carrying more than 6 passengers for hire. This watch must be maintained whenever the station is not being used for authorized traffic. However, a watch on 156.800 MHz need not be maintained by a vessel maintaining a watch on the bridge-to-bridge frequency 156.650 MHz *and* participating in a Vessel Traffic Services (VTS) system and maintaining a watch on the specified VTS frequency.

(2490) (2)–156.650 MHz on board a vessel 38 meters (124 feet) and over in length, a vessel engaged in towing (See §80.951(b)), or a vessel carrying more than six passengers for hire. This watch must be maintained continuously and effectively. Sequential monitoring is not sufficient. Portable VHF equipment may be used to meet this requirement. Vessels are exempted from this requirement while transiting the St. Lawrence Seaway and complying with the Joint Regulations of the St. Lawrence Seaway Authority and St. Lawrence Seaway Development Corporation between the lower exit of St. Lambert Lock at Montreal and Crossover Island, New York and in the Welland Canal and approaches between Calling in Point No. 15 and No. 16.

(2491) (b) The watch must be maintained by the master, or person designated by the master, who may perform other duties provided they do not interfere with the effectiveness of the watch.

**Subpart T–Radiotelephone Installation Required for Vessels on the Great Lakes**

(2492) **§80.951 Applicability.**

(2493) The Agreement Between the United States of America and Canada for Promotion of Safety on the Great Lakes by Means of Radio, 1973, applies to vessels of all countries when navigated on the Great Lakes. The Great Lakes Radio Agreement defines the Great Lakes as "all waters of Lakes Ontario, Erie, Huron (including Georgian Bay), Michigan, Superior, their connecting and tributary waters and the River St. Lawrence as far east as the lower exit of the St. Lambert Lock at Montreal in the Province of Quebec, Canada," but shall not include such of the connecting and tributary waters as may be specified in the Technical Regulations." The Technical Regulations do not include any connecting and tributary waters except the St. Mary's River, the St. Clair River, Lake St. Clair, the Detroit River and the Welland Canal. A vessel to which the Great Lakes Agreement applies and which falls into the specific categories by paragraph (a), (b) or (c) of this section and not excepted by paragraph (d) or (e) of this section shall comply with this subpart while navigated on the Great Lakes.

(2494) (a) Every vessel 20 meters (65 feet) or over in length (measured from end to end over the deck, exclusive of sheer).

(2495) (b) Every vessel engaged in towing another vessel or floating object, except:

(2496) (1) Where the maximum length of the towing vessel, measured from end to end over the deck exclusive of sheer, is less than twenty-six (26) feet and the length or breadth of the tow, exclusive of the towing line, is less than 20 meters (65 feet);

(2497) (2) Where the vessel towed complies with this subpart;

(2498) (3) Where the towing vessel and tow are located within a booming ground (an area in which logs are confined); or

(2499) (4) Where the tow has been undertaken in an emergency and neither the towing vessel nor the tow can comply with this part.

(2500) (c) Any vessel carrying more than six passengers for hire.

(2501) (d) The requirements of the Great Lakes Radio Agreement shall not apply to:

(2502) (1) Ships of war and troop ships;

(2503) (2) Vessels owned and operated by any national government and not engaged in trade.

(2504) (e) The Commission may, if it considers that the conditions of the voyage or voyages affecting safety (including but not necessarily limited to the regularity, frequency and nature of the voyages, or other circumstances) are such as to render full application of the Great Lakes Agreement unreasonable or unnecessary, may exempt partially, conditionally or completely any individual vessel for one or more voyages or for any period of time not exceeding one year.

(2505) **§80.953**

(2506) Inspection and certification.

(2507) Each U.S. flag vessel subject to the Great Lakes Agreement must have an inspection of the required radiotelephone installation not less than once every twelve months. However, a one month extension of an FCC certificate may be granted by the Commission. This inspection must be made while the vessel is in active service or within not more than one month before the date on which it is placed in service. A Great Lakes Agreement Radiotelephony Certificate will be issued to vessels in compliance. The certificate must be posted at the principal operating position of the radiotelephone installation.

(2508) **§80.955 Radiotelephone Installation.**

(2509) (a) Each U.S. flag vessel of less than 38 meters (124 feet) in length while subject to the Great Lakes Agreement must have a radiotelephone meeting the provisions of this subpart in addition to the other rules in this part governing ship stations using telephony.

(2510) (b) Each U.S. flag vessel of 38 meters (124 feet) or more in length while subject to the Great Lakes Agreement must have a minimum of two VHF radiotelephone installations in operating condition meeting the provisions of this subpart. The second VHF installation must be electrically separate from the first VHF installation. However, both may be connected to the main power supply provided one installation can be operated from a separate power supply located as high as practicable on the vessel.

(2511) (c) This paragraph does not require or prohibit the use of other frequencies for use by the same "radiotelephone installation" for communication authorized by this part.

(2512) **§80.956 Required frequencies and uses.**

(2513) (a) Each VHF radiotelephone installation must be capable of transmitting and receiving G3E emission as follows:

(2514) (1) Channel 16–156.800 MHz–Distress, Safety and Calling; and

(2515) (2) Channel 6–156.300 MHz–Primary intership.

(2516) (b) The radiotelephone station must have additional frequencies as follows:

(2517) (1) Those ship movement frequencies appropriate to the vessel's area of operation: Channel 11–156.550 MHz, Channel 12–156.600 MHz, Channel 13–156.650 MHz or Channel 14–156.700 MHz.

(2518) (2) Such other frequencies as required for the vessel's service.

(2519) (3) One channel for receiving marine navigational warnings for the area of operation.

(2520) (c) Every radiotelephone station must include one or more transmitters, one or more receivers, one or more sources of energy and associated antennas and control equipment. The radiotelephone station, exclusive of the antennas and source of energy, must be located as high as practicable on the vessel, preferably on the bridge, and protected from water, temperature, and electrical and mechanical noise.

(2521) **§80.957 Principal operating position.**

(2522) (a) The principal operating positions of the radiotelephone installation must be on the bridge, convenient to the conning position.

(2523) (b) When the radiotelephone station is not located on the bridge, operational control of the equipment must be provided at the location of the radiotelephone station and at the bridge operating position. Complete control of the equipment at the bridge operating position must be provided.

(2524) **§80.959 Radiotelephone transmitter.**

(2525) (a) The transmitter must be capable of transmission of G3E emission on the required frequencies.

(2526) (b) The transmitter must deliver a carrier power of between 10 watts and 25 watts into 50 ohms nominal resistance when operated with its rated supply voltage. The transmitter must be capable of readily reducing the carrier power to one watt or less.

(2527) (c) To demonstrate the capability of the transmitter, measurements of primary supply voltage and transmitter output power must be made with the equipment operating on the vessel's main power supply, as follows:

(2528) (1) The primary supply voltage measured at the power input terminals to the transmitter terminated in a matching artificial load, must be measured at the end of 10 minutes of continuous operation of the transmitter at its rated power output.

(2529) (2) The primary supply voltage, measured in accordance with the procedures of this paragraph, must be not less than 11.5 volts.

(2530) (3) The transmitter at full output power measured in accordance with the procedure of this paragraph must not be less than 10 watts.

(2531) **§80.961 Radiotelephone receiver.**

(2532) (a) The receiver must be capable of reception of G3E emission on the required frequencies.

(2533) (b) The receiver must have a sensitivity of at least 2 microvolts across 50 ohms for a 20 decibel signal-to-noise ratio.

(2534) **§80.963 Main power supply.**

(2535) (a) A main power supply must be available at all times while the vessel is subject to the requirements of the Great Lakes Radio Agreement.

(2536) (b) Means must be provided for charging any batteries used as a source of energy. A device which during charging of the batteries gives a continuous indication of charging current must be provided.

(2537) **§80.965 Reserve power supply.**

(2538) (a) Each passenger vessel of more than 100 gross tons and each cargo vessel of more than 300 gross tons must be provided with a reserve power supply independent of the vessel's normal electrical system and capable of energizing the radiotelephone installation and illuminating the operating controls at the principal operating position for at least 2 continuous hours under normal operating conditions. When meeting this 2 hour requirement, such reserve power supply must be located on the bridge level or at least one deck above the vessel's main deck.

(2539) (b) Instead of the independent power supply specified in paragraph (a) of this section, the vessel may be provided with an auxiliary radiotelephone installation having a power source independent of the vessel's normal electrical system. Any such installation must comply with §§80.955, 80.956, 80.957, 80.959, 80.961, 80.969 and 80.971, as well as the general techinical standards contained in this part. Additionally, the power supply for any such auxiliary radiotelephone must be a "reserve power supply" for the purposes of paragraphs (c), (d) and (e) of this section.

(2540) (c) Means must be provided for adequately charging any batteries used as a reserve power supply for the required radiotelephone installation. A device must be provided which, during charging of the batteries, gives a continuous indication of charging.

(2541) (d) The reserve power supply must be available within one minute.

(2542) (e) The station licensee, when directed by the Commission, must prove by demonstration as prescribed in paragraphs (e)(1), (2), (3) and (4) of this section that the reserve power supply is capable of meeting the requirements of paragraph (a) of this section as follows:

(2543) (1) When the reserve power supply includes a battery, proof of the ability of the battery to operate continuously for the required time must be established by a discharge test over the required time, when supplying power at the voltage required for normal operation to an electric load as prescribed by paragraph (e)(3) of this section.

(2544) (2) When the reserve power supply includes an engine driven generator, proof of the adequacy of the engine fuel supply to operate the unit continuously for the required time may be established by using as a basis the fuel consumption during a continuous period of one hour when supplying power, at the voltage required for normal operation, to an electrical load as prescribed by paragraph (3)(e) of this section.

(2545) (3) For the purposes of determining the electrical load to be supplied, the following formula must be used:

(2546) (i) One-half of the current of the radiotelephone while transmitting at its rated output, plus one-half the current while not transmitting; plus

(2547) (ii) Current of the required receiver; plus

(2548) (iii) Current of the source of illumination provided for the operating controls prescribed by Section 80.969; plus

(2549) (iv) The sum of the currents of all other loads to which the reserve power supply may provide power in time of emergency or distress.

(2550) (4) At the conclusion of the test specified in paragraphs (e)(1) and (2) of this section, no part of the reserve power supply must have excessive temperature rise, nor must the specific gravity or voltage of any battery be below the 90 percent discharge point.

(2551) **§80.967 Antenna system.**

(2552) The antenna must be omnidirectional, vertically polarized and located as high as practicable on the masts or superstructure of the vessel.

(2553) **§80.969 Illumination of operating controls.**

(2554) (a) The radiotelephone must have dial lights which illuminate the operating controls at the principal operating position.

(2555) (b) Instead of dial lights, a light from an electric lamp may be provided to illuminate the operating controls of the radiotelephone at the principal operating position. If a reserve power supply is required, arrangements must permit the use of that power supply for illumination within one minute.

(2556) **§80.971 Test of radiotelephone installation.**

(2557) At least once during each calendar day a vessel subject to the Great Lakes Radio Agreement must test communications on 156.800 MHz to demonstrate that the radiotelephone installation is in proper operating condition unless the normal daily use of the equipment demonstrates that this installation is in proper operating condition. If equipment is not in operating condition, the master must have it restored to effective operation as soon as possible.

# 3. THE GREAT LAKES

(1) **The Great Lakes system** includes Lakes Ontario, Erie, Huron, Michigan, and Superior, their connecting waters, and the St. Lawrence River. It is one of the largest concentrations of fresh water on the earth. The system, including the St. Lawrence River above Iroquois Dam, has a total shoreline of about 11,000 statute miles (9,559 nm), a total water surface area of about 95,000 square statute miles (24,600,000 hectares), and a total drainage basin of almost 300,000 square statute miles (77,700,000 hectares). With the opening of the St. Lawrence Seaway, the system provides access by oceangoing deep-draft vessels to the great industrial and agricultural heartland of the North American continent. From the Strait of Belle Isle at the mouth of the Gulf of St. Lawrence, the distance via the St. Lawrence River to Duluth, MN, at the head of Lake Superior is about 2,340 statute miles (2,033 nm) and to Chicago, IL, near the S end of Lake Michigan is about 2,250 statute miles (1,955 nm). About 1,000 statute miles (870 nm) of each of these distances is below Montreal, the head of deep-draft ocean navigation on the St. Lawrence River.

(2) Small craft and barge traffic may also reach the Great Lakes via two shallow-draft routes; from the Gulf of Mexico via the Mississippi River and the Illinois Waterway to Lake Michigan at Chicago, IL, a distance of about 1,530 statute miles (1,329.5 nm), and from New York Harbor via the Hudson River and the New York State Barge Canal System to Lake Ontario at Oswego, N.Y., a distance of 340 statute miles (295.5 nm), or to the Niagara River at Tonawanda, N.Y., a distance of 496 statute miles (431 nm).

(3) The following table shows the controlling dimensions for these three routes and for other canals within the Great Lakes system.

(4) **The following limiting dimensions in feet (meters) are for each of the three routes described above and for canal navigation in the Great Lakes system:**

(5) ***St. Lawrence River–**

(6) depth, 26 feet (7.9 meters);

(7) width, 76 feet (23.16 meters);

(8) length, 730 feet (222.5 meters), 740 feet (225.5 meters) when certain conditions are met;

(9) vertical clearance, 117 feet (35.6 meters).

(10) **Mississippi River-Illinois Waterway–**

(11) depth, 9 feet (2.7 meters);

(12) width, 80 feet (24.38 meters);

(13) length, 600 feet (182.88 meters);

(14) vertical clearance, 17 feet (5.18 meters).

(15) **N.Y. State Canals-Hudson River to Oswego–**

(16) depth, 13 feet (4 meters);

(17) width, 43.5 (13.2 meters);

(18) length, 300 feet (91.4 meters);

(19) vertical clearance, 20 feet (6.1 meters).

(20) **Hudson River to Whitehall, and from Three Rivers to Ithaca, Montour Falls, and Tonawanda–**

(21) depth, 12 feet (3.66 meters);

(22) width, 43.5 feet (13.2 meters);

(23) length, 300 feet (91.4 meters);

(24) vertical clearance, 15.5 feet (4.7 meters).

(25) **Riviere Richelieu-Lake Champlain to St. Lawrence River–**

(26) depth, 6 feet (1.8 meters);

(27) width, 23.2 feet (7.07 meters);

(28) length, 111.4 feet (33.8 meters);

(29) vertical clearance, 29 feet (8.8 meters).

(30) ***Welland Canal–**

(31) depth, 26 feet (7.9 meters);

(32) width, 76 feet (23.16 meters);

(33) length, 730 feet ( 222.5 meters), 740 feet (225.5 meters) when certain conditions are met;

(34) vertical clearance, 117 feet (35.66 meters).

(35) **St. Marys Falls Canal (Soo Locks)**–(See Limiting Dimensions of Through Channel, chapter 12, St. Marys River.)

(36) *Minimum limiting measurements for transit of the entire Seaway by pleasure craft are a deadweight of 1 short ton (0.9 metric ton) or 20 feet (6.1 meters) in overall length. These control factors are based on requirements for passage through the South Shore Canal, Beauharnois Canal, and the Welland Canal.

(37) The **St. Lawrence Seaway** includes the waters of the St. Lawrence River above Montreal, Lake Ontario, the Welland Canal, and Lake Erie as far W as Long Point. The canals and locks of the Seaway overcome the rapids and water level differences in the St. Lawrence River between the ocean and Lake Ontario and between Lake Ontario and Lake Erie and enable deep-draft oceangoing vessels to proceed from the Atlantic Ocean to Lake Superior, the farthest inland major lake. The development, operation, and maintenance of the Seaway are under the joint control of The **Saint Lawrence Seaway Development Corporation,** a corporate agency of the United States, and The **St. Lawrence Seaway Management Corporation of Canada**. The Corporation headquarters is in Washington, D.C., and the operational field headquarters is in Massena, N.Y. The Canadian Corporation headquarters is in Cornwall, Ont., with field offices in Cornwall, St. Lambert, and St. Catharines. (See appendix for addresses.)

(38) The United States and Canadian Corporations jointly publish the **Seaway Handbook,** which contains regulations issued by the respective governments and other information relating to operational requirements of vessels transiting the Seaway. The Handbook also contains a schedule of Seaway tolls. The regulations contained in the Handbook are also codified in 33 CFR 401. A copy of the regulations is required to be kept on board every vessel transiting the Seaway. (See **33 CFR 401**, chapter 2.)

(39) The Corporations each issue **Seaway Notices,** which contain information on changes in aids to navigation and other information relating to safety of navigation in the Seaway. The information contained in the notices is also broadcast by Seaway radio stations. The Seaway Notices are available at appropriate locks and canals and at the offices of the Seaway entities.

(40) Aids to navigation in U.S. waters of the Seaway between St. Regis and the head of the St. Lawrence River are operated and maintained by The Saint Lawrence Seaway Development Corporation and are described in the U.S. Coast Guard Light List. Buoys off station, lights extinguished or malfunctioning, and other defective conditions should be reported promptly, by radio or other

means, to the nearest Coast Guard unit or to Massena traffic control center via "Seaway Eisenhower" or "Seaway Clayton."

(41) **Vessel Traffic Services.**–A Vessel Traffic Service (VTS) has been established in St. Marys River. The Service has been established to prevent collisions and groundings, to protect improvements to the waterway, and to protect the navigable waters from environmental harm.

(42) The Vessel Traffic Service provides for a Vessel Traffic Center (VTC), voice call, "Soo Control," that may regulate the routing and movement of vessels by movement reports of vessels, specific reporting points, and VHF-FM radio communications. The Service includes one- and two-way traffic areas, areas of allowed and prohibited anchorage, and speed limits.

(43) Participation in the Vessel Traffic Service (St. Marys River) is mandatory. (See **33 CFR 161.801 through 161.894,** chapter 2, for regulations affecting vessel operations in the Vessel Traffic Service, and chapter 12 for details.)

(44) The Canadian Coast Guard operates a **Vessel Traffic Service (VTS)** in Canadian waters from Long Point in Lake Erie through the Detroit and St.Clair Rivers to De Tour Reef Light in Lake Huron. The service is mandatory from Detroit River East Outer Channel Lighted Buoy 1 and West Outer Channel Lighted Bell Buoy 1 to a point 30 minutes N of Lake Huron Cut Lighted Horn Buoy 11. The service is voluntary in the remaining waters. The service is designed to enhance the safe and expeditious movement of marine traffic by encouraging the monitoring of a common radio frequency by vessels within each sector of the service. The service provides users with information on traffic situations pertaining to no meeting zones, as well as information to pilots, the St. Lawrence Seaway Authority, the public, vessel owners, and shipping agents.

(45) The service is divided into two traffic sectors, each with a specific operating frequency: **Sector 1,** VHF-FM channel 11, the Canadian waters from De Tour Reef Light to Lake St. Clair Light in Lake St. Clair; and **Sector 2,** VHF-FM channel 12, the Canadian waters from Lake St. Clair Light to Long Point Light in Lake Erie.

(46) The VTS is administered by the VTS Center at Sarnia, Ont., at the head of the St. Clair River. The center is equipped with VHF transmitting and receiving facilities both locally and from remote sites. Participating vessels should report their name and ETA at the next calling-in point to the VTS Center and, on request, will receive all reported information on vessel traffic in their area. In the voluntary participation areas of the VTS, calling-in points are located in Lake Erie abeam Long Point Light and abeam Southeast Shoal Light and in Lake Huron abeam Harbor Beach Light or Point Clark Light, abeam Cove Island Light, abeam Great Duck Island Light, and abeam De Tour Reef Light. A voluntary calling-in point is within the mandatory area of the VTS at Lake Huron Cut Lighted Buoy 11. Calling-in points in the mandatory participation areas of the VTS are identical to those of the U.S. Coast Guard vessel traffic reporting system described in **33 CFR 162.130 through 162.140** (see chapter 2). (For complete information on the VTS, including calling-in points and message content, refer to the Annual Edition of Canadian Notices to Mariners.)

(47) Mariners are cautioned that not all vessels navigating in the voluntary areas of the service may be participating. The service is in no way an attempt by the Canadian Coast Guard to regulate the navigation or maneuvering of vessels from a shore station. The VTS does not override the responsibility of the master for the safe navigation of his vessel in accordance with the Navigation Rules.

(48) **Navigation regulations.**–The U.S. Coast Guard has established a **vessel traffic reporting system** and related navigation regulations for the connecting waters from Lake Erie to Lake Huron. The reporting system is operated through the Canadian Vessel Traffic Service Center at Sarnia, Ont. (See **33 CFR 162.130 through 162.140,** chapter 2, for complete information.)

(49) **Vessel Traffic Management.**–A Vessel Traffic Management Contingency Plan (VTM) for the Detroit and St. Clair Rivers has been agreed upon by the United States Coast Guard and the Canadian Department of Transport. The purpose of the system is to enhance the safety of navigation in the rivers during periods of exceptionally hazardous navigation conditions and to protect the navigable waters of the rivers from environmental harm. These objectives are accomplished by establishing criteria for allowing vessels to transit the system, by managing vessel entries and transits of the system, and by establishing no passing zones as required. The system is implemented only in cases of emergency, upon agreement of the Commander, U.S. Coast Guard Ninth District, and the Director, Central Region, Canadian Department of Transport. The implementation will be promulgated through Broadcast Notice to Mariners.

(50) This VTM system applies to all vessels 65 feet (19.8 meters) or over in length, all commercial vessels 26 feet (7.9 meters) or over in length when engaged in towing another vessel astern, alongside, or by pushing ahead, and each dredge or floating plant operating in the VTM area. Vessels in Sector 1 of the system, the Detroit River and Lake St. Clair S of Lake St. Clair Light, shall communicate with Detroit Vessel Traffic Center on VHF-FM channel 12. Vessels in Sector 2, Lake St. Clair N of Lake St. Clair Light and St. Clair River, shall communicate with Sarnia Vessel Traffic Center on VHF-FM channel 11. The secondary communications frequency for both sectors is VHF-FM channel 16.

(51) **Ports and Waterways Safety.**–(See **33 CFR 160,** chapter 2, for regulations governing vessel operations and requirements for notifications of arrivals, departures, hazardous conditions, and certain dangerous cargoes to the Captain of the Port.)

(52) **Disposal Sites** and **Dumping Grounds.**–These areas are rarely mentioned in the Coast Pilot, but are shown on the nautical charts. (See Dump Sites and Dumping Grounds, chapter 1, and charts for limits.)

(53) **Ballast Water Management.**– Vessels are required to carry out an exchange of ballast water on the waters beyond the EEZ prior to entry into Snell Lock, at Massena, NY. (See **33 CFR 151.1502 through 151.1516,** chapter 2, for regulations.)

(54) **Potable Water Intakes.**–Vessels operating on freshwater lakes or rivers including the Great Lakes and connecting waters shall not discharge sewage, ballast, or bilge water, within the restricted areas adjacent to potable water intakes as are designated by the Surgeon General of the United States. (See **21 CFR 1250.93,** chapter 2.)

(55) **Note.**–This regulation, originally published under Title 42, Public Health, by the U.S. Public Health Service, is published in Title 21, Food and Drugs; cognizant agency, Food and Drug Administration.

(56) The current list of restricted vessel waste discharge areas adjacent to potable (domestic) water intakes is contained in the Federal Register of September 16, 1960 (25 F.R. 8925). The areas were described and located by both geographical coordinates and by NOS Chart Numbers.

(57) Except as otherwise specifically indicated in the above list, in each case the restricted area includes the water within a circle having a radius of 3 statue miles (2.6 nm) with the domestic

water intake as its center, in no event, however, extending beyond the International boundary line with Canada.

(58) This restriction applies to all vessels which are underway, moored, or anchored within the restricted areas subject to the following provisions:

(59) 1. Vessels moored at docks shall not discharge sewage, ballast or bilge water overboard if dock facilities for the disposal of such waste are available.

(60) 2. Vessels required to anchor within a restricted area under an emergency condition for the safety of the vessel are exempted.

(61) 3. Vessels which provide sewage or waste treatment approved by the . . . (Commissioner of Food and Drugs), are exempted from that portion of the restriction applicable to sewage.

(62) The list of intakes and the extent of the restricted areas may be revised from time to time.

(63) **Danger zones** have been established within the area of this Coast Pilot. (See **33 CFR 334,** chapter 2, for limits and regulations.)

(64) **Drawbridges.**–The general regulations that apply to all drawbridges are given in **117.1 through 117.49**, chapter 2, and the specific regulations that apply only to certain drawbridges are given in **Part 117, Subpart B**, chapter 2. Where these regulations apply, references to them are made in the Coast Pilot under the name of the bridge or the waterway over which the bridge crosses.

(65) The drawbridge opening signals (see **117.15**, chapter 2) have been standardized for most drawbridges within the United States. The opening signals for those few bridges that are nonstandard are given in the specific drawbridge regulations. The specific regulations also address matters such as restricted operating hours and required advance notice for openings.

(66) The mariner should be acquainted with the general and specific regulations for drawbridges over waterways to be transited.

(67) **Fluctuations of water level.**–The water levels of the Great Lakes are subject to three types of fluctuation: seasonal, long range, and short period. Seasonal or annual fluctuations cover a period of about 1 year, long range fluctuations a few or many years, and short period fluctuations from several minutes to a few days. Seasonal and long range fluctuations generally affect an entire lake, while short period fluctuations are local in scope.

(68) The seasonal fluctuations are the most regular, with the highest levels usually occurring in summer and the lowest in winter. These fluctuations are caused by a number of factors that affect lake levels, including rain and snowfall, evaporation, ground water levels, and runoff from the land. From year to year, the magnitude of the fluctuation between the high and the low and the months in which these occur may vary considerably in an individual lake. Lake Superior is generally last to reach its seasonal low and seasonal high, in March and September, respectively. Lakes Michigan and Huron usually reach their low in February and their high in July. Lake Erie usually reaches its low in February and its high in June. Lake Ontario usually reaches its low in January and its high in June. The amount of fluctuation between the seasonal high and low is generally least in Lake Superior and most in Lake Ontario.

(69) Long range fluctuations of the lake levels are caused by long term variations of the same factors which affect seasonal fluctuations. Precipitation is the most important of these factors. Long periods of above or below normal rain and snowfall are usually followed by higher or lower lake levels, but this effect may be increased or decreased by combination with the other factors that affect lake level. Another cause of long range fluctuations is the uplifting of the earth's crust in the Great Lakes region. When the outlet of the lake is rising in relation to the lake shores, the water level rises with respect to the land. This effect is occurring in all the lakes, except for parts of the NE shores of Lake Superior and Lake Huron.

(70) Short period fluctuations occur in amounts varying from a few inches to several feet and for periods varying from a few minutes to a day, depending on the locality where they occur. These fluctuations are caused by winds, by sudden barometric pressure changes, and by oscillations called seiches, which may be caused by one or both of the other two. Sustained winds drive forward a greater volume of surface water than can be carried off by the subsurface return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This effect is more pronounced in bays and at the extremities of the lakes, where the impelled water is concentrated in a small space by converging shores, especially if coupled with a gradually sloping inshore bottom which even further reduces the flow of the lower return currents. Closely spaced high and low barometric pressure centers moving across a lake cause a temporary tilting of the water surface. The amount of this tilting is dependent on the pressure gradient and the speed of the moving centers. **Seiche** (pronounced saych) is an oscillation that occurs when winds and/or barometric pressure differences causing a fluctuation have diminished. The lake surface is in a tilted condition, and a surge of water takes place from the high area to the low. An imbalance in the opposite direction occurs and causes a return surge. This effect continues, with each successive surge diminished by friction until the seiching action ceases.

(71) Lunar tides are known to exist on the Great Lakes, particularly on those lakes with an E and W axis. However, the effects of these tides are so small as to be inconsequential when compared to the effects of other short period fluctuations. (See the appendix for a list of water level publications published by NOS and the Corps of Engineers.)

(72) **Weather, The Great Lakes.**–This section presents an overall, seasonal picture of the weather that can be expected in the Great Lakes region of the United States. Detailed information, particularly concerning navigational weather hazards, can be found in the weather articles in the following chapters.

(73) All weather articles in this volume are the product of the National Oceanographic Data Center (NODC) and the National Climatic Data Center (NCDC). The meteorological and climatological tables are the product of the NCDC. Both centers are entities of the National Environmental Satellite, Data, and Information Service (NESDIS) of the National Oceanic and Atmospheric Administration (NOAA). If further information is needed in relation to the content of the weather articles, meteorological tables or climatological tables, contact the National Climatic Data Center, Attn: Customer Service Division, Federal Building, 151 Patton Avenue, Room 120, Asheville, NC 28801-5001. You may also contact the CSD at 704-271-4994, or fax your request to 704-271-4876.

(74) Climatological tables for lakeshore and near-lakeshore locations, and meteorological tables for select lake areas follow the appendix. The climatological tables are a special extraction from the International Station Meteorological Climate Summary. The ISMCS is a CD-ROM jointly produced by the National Climatic Data Center, Fleet Numerical Meteorology and Oceanography Detachment-Asheville, and the U.S. Air Force Environmental Technical Applications Center, Operating Location - A. The

meteorological tables for the lake areas are compiled from observations made by ships in passage and extracted from the National Climatic Data Center's Tape Deck-1129, Surface Marine Observations. Listed in the appendix are National Weather Service offices and radio stations which transmit weather information.

(75) Marine Weather Services Charts published by the National Weather Service show radio stations that transmit marine weather broadcasts and additional information of interest to mariners. These charts are for sale by the National Ocean Service Distribution Division (N/ACC3). (See appendix for address.)

(76) Weather can make navigating the Great Lakes a pleasure, a challenge, or a terror. Each season has its own weather problems, each waterway its own peculiarities.

(77) Winter navigation is severely restricted by ice and storms. Ice coverage and thickness vary from lake to lake and season to season. Seaway shipping is usually at a standstill from mid-December through early April. Great Lakes shipping extends into the winter but depends upon local conditions. The ice threat is compounded by fierce winter storms which bring a variety of wind, wave, and weather problems on an average of every 4 days. A combination of strong winds, rough seas, and cold temperatures can result in superstructure icing, in which sea spray and sometimes precipitation can freeze to a ship's superstructure. This adds tremendous weight and creates dangerous instability.

(78) Spring storms can generate gales and rough seas, but with the approach of summer they become less frequent and severe. Fog is the principal navigational headache. Relatively warm air pumped over still cold lake waters creates an advection fog that plagues the mariner into the summer. In late spring, thunderstorms become an occasional problem.

(79) While fog can hinder navigation and an occasional low-pressure system can bring a spell of bad weather, this is usually the most troublefree time. The principal threat is the thunderstorm. While they can occur in any month, they are most likely from May through October. They can spring up quickly and generate strong winds and rough seas.

(80) Autumn is dangerous. Clear, crisp days are often interrupted by rapidly intensifying low-pressure systems whose gale-force winds can whip tumultuous seas. Energy is supplied by the still warm waters, and contrasting air masses can spawn storms right over the Great Lakes Basin. Occasionally, an errant tropical cyclone makes its way into the region. Fog can be a local, generally nearshore, problem on calm, clear nights. It usually lifts shortly after sunrise.

(81) **Extratropical Cyclones.**–The Great Lakes lie in the midst of a climatological battlefield, where northern polar air often struggles for control with air from the Tropics. During spring and autumn, the zone separating these two armies lies over the Lakes region. The contrast between the two triggers the formation of a number of low-pressure systems, often intense, often fast moving. The Lakes provide moisture and, in the fall, heat to fuel these winter-type storms. They also aid storms that migrate from other regions.

(82) The more destructive storms usually come from the SW or W. Lows spawned in the Pacific southwest, Arizona-New Mexico, and the central Rocky Mountain and Great Plains States account for nearly half of the storms that enter the Great Lakes Basin from October through May. Another source is western Canada, which spawns the **"Alberta Lows."** At a peak in October, these storms arrive from the W and NW. They are relatively weak and rarely generate gales; however, occasionally one has been known to kick up 60-knot winds after intensifying over friendly waters.

(83) When a ship is S of an eastward-moving storm center, the approach of the low is heralded by a falling barometer, a SE to S wind, lowering clouds, and drizzle, rain, or snow. Precipitation diminishes and the wind veers as the warm front nears. In the warm sector, temperatures rise, skies brighten, and the air is humid with haze or fog. The passage of the cold front is marked by a bank of convective clouds to the W, a sharp veering of the wind to the W or NW, and sometimes sudden squalls with showers or thunderstorms. Behind the cold front, pressure rises, temperatures fall, visibility increases, and cloud cover decreases.

(84) When a ship is N of the storm center, changes in the weather are less rapid and less distinctive than when sailing S of the center. Winds ahead of the low gradually back from the E through N to NW. The weather conditions also vary, gradually shifting from those found in advance of the warm front to those behind the cold front.

(85) **Tropical Cyclones.**–Each of the Great Lakes, except for Lake Superior, has been effected by tropical cyclones since 1900. The origin for tropical activity in this region may come either from the Gulf of Mexico or the western Atlantic. A total of 33 storms, most in the decaying stages have traversed at least one of the lakes since the turn of the century. Most have completed the extratropical transition either before reaching the lakes or in the proximity and are greatly weakened. A few, most notable Hurricane Hazel in 1954, became a fully cold-core system and was nearly as strong while crossing the region as when making initial landfall hundreds of miles away. Hazel came ashore in southeastern North Carolina packing winds of 110 knots. By the time the storm had reached Lake Ontario 18 hours later, winds were still 70 knots. This strength was maintained while crossing the lake and weakening finally occured in southern Ontario.

(86) **Thunderstorms.**–While they can develop in any month, thunderstorms are most likely from May through October. They can occur in squall lines or a single cell. They can stir a breeze or kick up gusts of 100 knots. They can spring up rapidly or be tracked for several days. They can bring a gentle shower or harbor a tornado or waterspout. They can create serious problems for the Great Lakes mariner. The number of days with thunderstorms can vary from year to year, but on the average they can be expected on 5 to 10 days per month during the summer. The Lakes themselves can influence this frequency. Cool water and a strong lake breeze both inhibit summertime convective activity over water. For example, Lake Michigan suppresses thunderstorm activity during the summer, but increases it slightly in autumn. Along the shore, activity is most likely in the afternoon and evening, while over open waters it is more likely at night.

(87) **Fog.**–Fog can form in any season, but it is most likely in spring and early summer, particularly over open waters. Along the shore, fog is also common in autumn. Occasionally, steam fog will develop during the winter. The densest and most widespread fog is the advection type, where relatively warm air flows over cooler water. These conditions exist in spring and summer. Fog is particularly tenacious over the NW portions of the lakes, where the cold water is continually brought to the surface by upwelling. This fog is often persistent. It may lift somewhat during the day, but unless broken up by a good wind, will lower again during the night. Radiation fog is formed by the air in contact with a rapidly cooling land surface, such as occurs on clear, calm autumn nights. This fog forms onshore and may drift out over the lakes during the early morning. It is usually not as dense nor persistent as advection fog and should lift by noon. Steam fog or arctic sea smoke occurs when frigid arctic air moves across the lakes and picks up enough

moisture to become saturated. This fog may vary from 5 to 5,000 feet (1 to 1,500 meters) in depth, although it is seldom very dense.

(88) **Ice.**–Ice begins to form slowly, usually in early November, in the shallows, coves, and inlets. Gradually it spreads and thickens, building out from the shore and breaking off. Since during most winters the period of freezing temperatures is not long enough to cause a lakewide solid ice sheet to form, most lakes are besieged by "pack ice," which, in its broadest sense, is any ice that is not fast ice. This pack ice is then susceptible to the whims of winds, waves, and currents. This can cause rapid changes in a real coverage, which make predictions of thickness, extent, and distribution difficult.

(89) The ice that builds out from the shore ranges from a few inches to several feet in thickness. Much of it breaks off to form floes and fields. Strong persistent winds cause windrows and pressure ridges to form. Some of these may extend 10 to 20 feet (3 to 6 meters) above the water and 30 to 35 feet (9 to 11 meters) below, anchoring themselves to the lake bottom. Pack slush ice, which is pack ice that is well broken up, is particularly harzardous to shipping. It is difficult to combat as it quickly closes in around a vessel, preventing movement in any direction. It can damage propellers and steering gear, clog condenser intakes, and exert tremendous pressure on the hull.

(90) Ice is often strong enough to halt navigation through the St. Lawrence Seaway by mid-December. The Seaway usually reopens by mid-April. Inter- and intra-lake shipping usually continues well into January with the help of icebreakers. A few channels remain open all season. Ice cover peaks in late February or early March. Soon the decay begins. By April, shipping is in full swing; however, some drift ice remains into May.

(91) **Cargo Care.**–High humidities and temperature extremes that can be encountered when navigating the Great Lakes may cause sweat damage to cargo. This problem is most likely when cargoes are loaded in warm summer air or can occur anytime temperatures fluctuate rapidly.

(92) When free air has a higher dewpoint than the temperature of the surface with which it comes in contact, the air is often cooled sufficiently below its dewpoint to release moisture. When this happens, condensation will occur aboard ship either on relatively cool cargo or on the ship's structure within the hold, where it drips onto the cargo. If cargo is stowed in a cool climate and the vessel sails into warmer waters, ventilation of the hold with outside air can lead to sweat damage of any moisture-sensitive cargo. Unless the cargo generates internal heat, then, as a rule, external ventilation should be shut off. When a vessel is loaded in a warm weather region and moves into a cooler region, vulnerable cargo should be ventilated.

(93) In general, whenever accurate readings show the outside air has a dewpoint below the dewpoint of the air surrounding the vulnerable cargo, such outside air is capable of removing moisture and ventilation may be started. However, if the outside dewpoint is higher than the dewpoint around the cargo, ventilation will increase moisture and result in sweating. This generally does not take into account the possibility of necessary venting for gases or fumes.

(94) **Optical Phenomena.**–The two basic types of optical phenomena are those associated with electromagnetic displays and those associated with the refraction or diffraction of light. The **aurora** and **Saint Elmo's fire** are electromagnetic displays. Halos, coronas, parhelia, sun pillars, and related effects are optical phenomena associated with the refraction and diffraction of light through suspended cloud particles; mirages, looming, and twilight phenomena such as the "**green flash**" are optical phenomena associated with the refraction of light through air of varying density. Occasionally, sunlight is refracted simultaneously by cloud suspensions and by dense layers of air producing complex symmetric patterns of light around the sun.

(95) A **mirage** is caused by refraction of light rays in a layer of air having rapidly increasing or decreasing density near the surface. A marked decrease in the density of the air with increasing altitude is the cause of such phenomena known as looming, towering, and superior mirages. Looming is said to occur when objects appear to rise above their true elevation. Objects below the horizon may actually be brought into view. Towering has the effect of elongating visible objects in the vertical direction. A superior mirage is so named because of the appearance of an image above the actual object. Ships have been seen with an inverted image above and an upright image floating above that.

(96) Such mirages, especially with looming and towering, are fairly common in the area, with frequency increasing toward the higher latitudes. They are most common in summer when the necessary temperature conditions are most likely. Another type, the inferior mirage, occurs principally over heated land surfaces such as deserts, but may be observed occasionally in shallow coastal waters, where objects are sometimes distorted beyond recognition. In contrast to the superior mirage, the condition necessary for the inferior mirage is an increasing air density with height. Atmospheric zones of varying densities and thicknesses may combine the effects of the various types of mirages to form a complicated mirage system known as **Fata Morgana.**

(97) The green flash is caused by refractive separation of the sun's rays into its spectral components. This may occur at sunrise or sunset when only a small rim of the sun is visible. When refractive conditions are suitable, red, orange, and yellow waves of sunlight are not refracted sufficiently to reach the eye, whereas green waves are. The visual result is a green flash in the surrounding sky.

(98) The refraction of light by ice crystals may result in many varieties of halos and arcs. Because red light is refracted the least, the inner ring of the halo is always red with the other colors of the spectrum following outward. Halos with radii of 22° and 46° have been observed with the refraction angle within the ice spicules determining which type may occur.

(99) Solar and lunar coronas consist of a series of rainbow-colored rings around the sun or moon. Such coronas resemble halos but differ in having a reverse sequence of the spectrum colors, red being the color of the outer ring, and in having smaller and variable radii. This reversed sequence of the spectrum occurs because coronas result from diffraction of light whereas the halo is a refraction phenomenon. The radius varies inversely as the size of the water droplets. Another type of diffraction phenomenon is the **Brocken bow** (also known as **glory**), which consists of colored rings around shadows projected against fog or cloud droplets.

(100) Ice blink, land blink, and water and land skies are reflection phenomena observed on the underside of cloud surfaces. Ice blink is a white or yellowish-white glare on the clouds above accumulations of ice. Land blink is a yellowish glare observed on the underside of clouds over snow-covered land. Over open water and bared land, the underside of the cloud cover when observed to be relatively dark is known as water sky and land sky. The pattern formed by these reflections on the lower side of the cloud surfaces is known as "sky map."

(101) Auroral displays are prevalent throughout the year, but are observed most frequently in the winter. Records show that the periods of maximum auroral activity coincide in general with the periods of maximum sunspot activity.

(102) The cloudlike, luminous glow is the most common of the auroral forms. The arc generally has a faint, nebulous, whitish appearance and is the most persistent of the auroras. Ray auroras are more spectacular but less persistent phenomena. They are usually characterized by colored streaks of light that vary in color and intensity, depending on altitude. Green is the most commonly observed hue, although red and violet may occur in the same display. The **aurora borealis** (northern lights) may be observed on occasion.

(103) Saint Elmo's fire is observed more rarely than the aurora and may occur anywhere in the troposphere. It occurs when static electricity collects in sufficiently large charges around the tips of pointed objects to ionize the air in its vicinity and leak off in faintly luminescent discharges. Saint Elmo's fire is observed occasionally on ship masts and on airplane wings in the vicinity of severe storms. It is described either as a weird, greenish glow or as thousands of tiny electrical sparks flickering along the sharp edges of discharging surfaces.

(104) **Winter Navigation.**–Ice normally begins to form in various parts of the Great Lakes during December and forms a hazard to navigation by the end of the month. Before the St. Lawrence Seaway closes in late December, most lake vessels lay up for the winter and oceangoing vessels transit the Seaway to the Atlantic. Historically, weather and ice conditions have necessitated the suspension of shipping in the lakes from about mid-December until early April.

(105) During the ice season, U.S. Coast Guard icebreakers, sometimes working in conjunction with Canadian Coast Guard icebreakers, conduct operations to maintain a broken track along the main vessel routes through the lakes, St. Marys River, and the Detroit-St. Clair River system and to assist vessels in transit as necessary. Floating aids to navigation, except those designated in the Coast Guard Light List as winter markers, are withdrawn from service immediately prior to the formation of ice on the lakes.

(106) The Coast Guard operates a VHF-FM radiotelephone vessel traffic reporting system on Lakes Superior, Michigan, Huron, Erie, and the St. Marys River. The system is designed to provide vessel traffic information, aid in the efficient deployment of icebreaking services, and obtain ice information from transiting vessels. Vessels are requested to contact the appropriate Coast Guard Task Group prior to or upon departure from port, upon arrival at their destination, and at specified calling-in points between.

(107) **Routes.**–The Lake Carriers' Association and the Canadian Shipowners Association have recommended, for vessels enrolled in the associations, separation routes for upbound and downbound vessels on the Great Lakes and connecting waterways. These routes are shown on the Great Lakes charts published by the National Ocean Service and are described in this Coast Pilot at the beginning of each affected chapter.

(108) **Pilotage.**–By International agreement between the United States and Canada, the waters of the Great Lakes and the St. Lawrence River have been divided into designated and undesignated waters for pilotage purposes. In designated waters, registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. In undesignated waters, registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters.

(109) The designated waters of the Great Lakes are divided into three districts as follows:

(110) **District 1,** all waters of the St. Lawrence River between the International boundary at St. Regis, Que., and a line at the head of the river running from Carruthers Point Front Range Light, Kingston, Ont., on a bearing of about 127° true through Wolfe Island South Side Light extended to the New York shore;

(111) **District 2,** all waters of Lake Erie W of a line on a bearing of about 026° true from Sandusky Harbor Pierhead Light at Cedar Point, Ohio, to Southeast Shoal Light; the waters contained within the area of a circle of 1 mile radius E of Sandusky Harbor Pierhead Light; the Detroit River; Lake St. Clair; the St. Clair River and the N approaches thereto S of latitude 43°05′30″N.; the Welland Canal which includes waters of the canal in the S approach within an arc drawn 1 mile to the S of the outer light on the W breakwater at Port Colborne, and in the N approach within an arc drawn 1 mile to the N of the W breakwater light at Port Weller; and

(112) **District 3,** all waters of the St. Marys River, Sault Ste. Marie locks, and approaches thereto between latitude 45°59′N. at the S approach and longitude 84°33′W. at the N approach.

(113) Undesignated waters are all waters of the Great Lakes other than designated waters. For purposes of pilotage, Great Lakes means Lakes Superior, Michigan, Huron, Erie, and Ontario, their connecting and tributary waters and the St. Lawrence River above St. Regis, and adjacent port areas.

(114) Oceangoing vessels entering the St. Lawrence River from sea make arrangements for pilotage service in advance through ships' agents. For vessels already on the Great Lakes that require pilotage service, the nearest pilot dispatch office is notified 12 hours ahead with a follow-up confirmation 4 hours in advance.

(115) The various regions of the Great Lakes are served by several associations of United States and Canadian registered pilots. The associations and their service areas are as follows:

(116) Laurentian Pilotage Authority, St. Lawrence River below the lower entrance to St. Lambert Lock at Montreal;

(117) Great Lakes Pilotage Authority, Ltd., Cornwall, and

(118) St. Lawrence Seaway Pilots Association, St. Lawrence River above the lower entrance to St. Lambert Lock at Montreal;

(119) Great Lakes Pilotage Authority, Ltd., St. Catharines, Lake Ontario, Welland Canal, and Lake Erie;

(120) Lakes Pilots Association, Lake Erie, Detroit River, and St. Clair River;

(121) Western Great Lakes Pilots Association, Lake Huron, Lake Michigan, St. Marys River, and Lake Superior. (See appendix for dispatch office addresses and telephone numbers.)

(122) Pilot exchange points are

(123) at St. Lambert Lock at Montreal;

(124) at Beauharnois Lock;

(125) at Snell Lock; off Cape Vincent, N.Y., at the head of the St. Lawrence River;

(126) 1 to 2 statute miles (0.9 to 1.7nm) N of Port Weller;

(127) 1 to 2 statute miles (0.9 to 1.7nm) S of Port Colborne;

(128) just below the Ambassador Bridge in the Detroit River;

(129) off Port Huron at the head of St. Clair River in about 43°05′30″N., 82°24′42″W.;

(130) at De Tour, Mich., at the mouth of St. Marys River; and

(131) at the head of St. Marys River about 3.5 statute miles (about 3 nm) SE of Point Iroquois.

(132) **Towage.**–Tugs are available at most of the major ports; they can usually be obtained for the smaller ports on advance notice if none are available locally. Arrangements for tugs should

be made in advance through the ships' agents or the pilots. See the text for the ports concerned as to the availability of tugs.

(133) **Vessel Arrival Inspections.**–Quarantine, customs, immigration, and agricultural quarantine officials are stationed in most major U.S. ports. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents. Unless otherwise directed, officials usually board vessels at their berths.

(134) **Harbormasters** are appointed for some of the principal ports. They have charge of enforcing harbor regulations, and in some instances are in charge of the anchorage and berthing of vessels.

(135) **Search and Rescue Telephone Number.**–(See this topic, chapter 1.)

(136) **Small-craft regulations, State of Michigan.**–The Marine Safety Act, Act No. 303, Public Acts of 1967, Michigan Compiled Laws states, in part:

(137) A person operating or propelling a vessel upon the waters of this State shall operate it in a careful and prudent manner and at such a rate of speed so as not to endanger unreasonably the life or property of any person. A person shall not operate any vessel at a rate of speed greater than will permit him, in the exercise of reasonable care, to bring the vessel to a stop within the assured clear distance ahead. A person shall not operate a vessel in a manner so as to interfere unreasonably with the lawful use by others of any waters.

(138) Persons operating vessels on the waters of this State shall maintain a distance of 100 feet (30.5 meters) from any dock, raft, buoyed or occupied bathing area, or vessel moored or at anchor, except when the vessel is proceeding at a slow-no wake speed or when water skiers are being picked up or dropped off, if such operation is otherwise conducted with due regard to the safety of persons and property and in accordance with the laws of this State.

(139) For purposes of this act, "Slow-no wake speed" means a very slow speed whereby the wake or wash created by the vessel would be minimal.

(140) In addition to the Marine Safety Act, the Law Enforcement Division of the Michigan Department of Natural Resources, in cooperation with local units of government, has established Special Local Watercraft Controls. These controls have been established in the interest of safety and to resolve conflicts of interest involving waterway usage. Speed limits contained in these regulations are described in the text.

(141) Additional information and copies of the Special Local Watercraft Controls and of Act 303 are available from the State of Michigan, Department of Natural Resources, Law Enforcement Division, Stevens T. Mason Building, Lansing, MI. 48933; telephone, 517-373-1230.

(142) **Small-craft harbors of refuge, State of Michigan.**–The Michigan State Waterways Commission, in conjunction with local municipalities, has constructed a series of small-craft harbors of refuge along the Michigan shorelines. The harbors are usually no more than 20 statute miles (17.4 nm) apart except on Lake Superior where they may be as much as 40 statute miles (34.8 nm) apart. The harbors, most of which are manned during the summer and equipped with VHF-FM channel 16, provide dockage and usually some services. These facilities are discussed in the text under **Small-craft facilities.**

(143) **Standard time.**–The area covered by this Coast Pilot is in two time zones, **Eastern standard time** and **Central standard time.**

(144) The boundary between Eastern standard time and Central standard time in the Great Lakes commences at the Lake Michigan shoreline intersection of the States of Michigan and Indiana, follows the northern boundary (which is offshore in Lake Michigan) of Indiana W to the W boundary (offshore in Lake Michigan) of Michigan, thence N along the Wisconsin-Michigan boundary (about midlake of Lake Michigan) to a point in about 45°15.2′N., 86°15.1′W., thence W along the Michigan-Wisconsin offshore boundary, passing between Rock Island, Wisc. and St. Martin Island, Mich., into Green Bay, thence to the Michigan shoreline in about 45°32.0′N., 87°16.2′W. (about 10 statute miles (8.7 nm) N of the mouth of Cedar River), thence along political boundaries (counties) to the Lake Superior shore of Michigan at about longitude 89°50.4′W. (about 10.3 statute miles (9 nm) NE of the mouth of Black River.) The boundary now proceeds W along the Michigan shore with the lakeshore areas within the Central standard time zone and the waters offshore within Eastern standard time zone to the Lake Superior shoreline intersection of the State boundary between Michigan and Wisconsin, thence about 024° following the offshore W boundary of the State of Michigan, crossing Lake Superior to the mouth of Pigeon River, the International boundary.

(145) Thus Eastern standard time (e.s.t.) is observed by the State of Michigan (except as noted below), the areas E of it, and the lakeshore areas of the Canadian Province of Ontario. Eastern standard time is 5 hours slow of Greenwich mean time (G.m.t.). Example: when it is 1000 at Greenwich it is 0500 at Detroit, Mich.

(146) Central standard time (c.s.t.) is observed in the Lake Michigan lakeshore areas of Indiana, Illinois, and Wisconsin, and the State of Michigan lakeshore areas on the W side of Lake Michigan as far N as about 10 statute miles (0.9 nm) N of the mouth of Cedar River. Now proceed to the N shore of Michigan's Upper Peninsular. Central standard time is observed from about 10 statute miles (0.9 nm) NE of Black River W to and through the lakeshore areas of Wisconsin and Minnesota. Central standard time is 6 hours slow of Greenwich mean time (G.m.t.). Example: when it is 1000 at Greenwich it is 0400 at Chicago, Ill.

(147) **Daylight saving time.**–Throughout the area of this Coast Pilot, clocks are advanced 1 hour on the first Sunday in April and are set back to standard time on the last Sunday in October.

(148) **Legal public holidays.**–The following are legal public holidays in the U.S. areas covered by this Coast Pilot: New Year's Day, January 1; Martin Luther King, Jr.'s Birthday, third Monday in January; Washington's Birthday, third Monday in February; Memorial Day, last Monday in May; Independence Day, July 4; Labor Day, first Monday in September; Columbus Day, second Monday in October; Veterans Day, November 11; Thanksgiving Day, fourth Thursday in November; and Christmas Day, December 25. The national holidays are observed by employees of the Federal Government and the District of Columbia, and may not be observed by all the States in every case.

(149) Other holidays observed in the area of this Coast Pilot are: Martin Luther King Day, January 15 in Illinois, third Sunday in January in New York, and third Monday in January in Ohio; Lincoln's Birthday, February 12, Illinois, Indiana, Michigan, New York, Pennsylvania, and Vermont; Washington-Lincoln Day, third Monday in February, Ohio and Wisconsin; Town Meeting Day, first Tuesday in March, Vermont; Good Friday, Indiana and Wisconsin; Verrazano Day, April 7, New York; Minnesota Day, May 11, Minnesota; Flag Day, June 14 in Pennsylvania and second Sunday in June in New York; Bennington Battle Day, August 16, Vermont; Senior Citizens Day, fourth Sunday in September, Indiana; Francis Willard Day, September 28, Minnesota; Leif Ericson

Day, October 9, Minnesota; General Pulaski Memorial Day, October 11, Indiana; and General Election Day, first Tuesday after the first Monday in November, Illinois, Indiana, New York, Pennsylvania, and Wisconsin.

(150) Holidays observed in the Canadian areas covered by this Coast Pilot are: New Years Day, January 1; Good Friday; Easter Monday; Victoria Day, Monday preceding May 25; Dominion Day, July 1; Civic Holiday, first Monday in August; Labor Day, first Monday in September; Thanksgiving Day, second Monday in October; Remembrance Day, November 11; Christmas Day, December 25; and Boxing Day, December 26.

# 4. ST. LAWRENCE RIVER ABOVE ST. REGIS

(1) The **St. Lawrence River,** 744 statute miles (672.6 nm) long, is one of the principal rivers of North America and provides access for oceangoing vessels to the Great Lakes and the great industrial and agricultural heartland of the continent. The river flows NE from its head in Lake Ontario, first along the United States-Canadian border, thence through the S part of Quebec Province past the cities of Montreal and Quebec before emptying into the Gulf of St. Lawrence. In its upper part, the river is wide and is filled with the Thousand Islands. Below Cornwall, Ont., the river widens into Lake St. Francis, thence into Lake St. Louis, thence descends through Lachine Rapids to Montreal. Lake St. Peter, another widened section, is between Sorel and Trois Rivieres. Below the city of Quebec, the river is a tidal estuary which gradually increases to a width of 90 statute miles (78.2 nm) at the mouth.

(2) This chapter describes the upper part of the river, from St. Regis, Que., upstream to Lake Ontario. No attempt has been made to mention all of the islands, shoals, winding channels, and irregularities of the mainland shores which characterize the river for most of its length. Mariners are referred to the charts for delineation of the intricate details of topography and hydrography.

(3) That part of the St. Lawrence River from Montreal upstream to Lake Ontario is part of the St. Lawrence Seaway and is under the navigational control of the Saint Lawrence Seaway Development Corporation, a corporate agency of the United States, and the St. Lawrence Seaway Management Corporation of Canada. These agencies issue joint regulations covering vessels and persons using the Seaway. The regulations are codified in **33 CFR 401** and are also contained in the Seaway Handbook, published jointly by the agencies. A copy of the regulations is required to be kept on board every vessel transiting the Seaway. A schedule of the Seaway tolls is contained in the handbook. (See St. Lawrence Seaway, chapter 3, and **33 CFR 401,** chapter 2.)

(4) **Vessel traffic control.**–The Seaway portion of the St. Lawrence River is divided into four traffic control sectors, with vessel movements in each sector controlled by a traffic controller. The objective of the system is to provide safe and efficient scheduling of vessel traffic, efficient search and rescue coverage, information regarding pilot requirements to the pilot dispatch centers, marine weather broadcasts, and information on vessel location to all interested parties.

(5) The traffic control sectors in the St. Lawrence River are as follows:

(6) Sector 1, from Montreal to about midlength of Lake St. Francis;

(7) Sector 2, from midlength of Lake St. Francis to Bradford Island;

(8) Sector 3, from Bradford Island to Crossover Island; and

(9) Sector 4, from Crossover Island to midlake in Lake Ontario.

(10) St. Lambert traffic control center controls traffic in Sector 1 through "Seaway Beauharnois," VHF-FM channel 14, and in Sector 3 through "Seaway Iroquois," VHF-FM channel 11. Massena traffic control center controls traffic in Sector 2 through "Seaway Eisenhower," VHF-FM channel 12, and in the St. Lawrence River portion of Sector 4 through "Seaway Clayton," VHF-FM channel 13. Complete information on the traffic control sectors and their respective calling-in points is contained in the Seaway Handbook.

(11) **Channels.**–The main vessel course through the river has been improved by dredging, and canals and locks have been constructed to bypass the rapids and to overcome the water level difference between the ocean and Lake Ontario. The controlling depth in the channels of the St. Lawrence Seaway through the river is 27 feet (8.2 meters).

(12) The maximum permissible draft in the Seaway is 26 feet (7.9 meters). The loading, draft, and speed of a vessel in transit shall be controlled by the vessel master according to the vessel's individual characteristics and its tendency to list or squat, so as not to strike bottom. The draft shall not in any case exceed the maximum permissible draft, which will be strictly enforced. Where a vessel's draft is in excess of the maximum permissible draft, the vessel will be delayed and the overdraft corrected before transit. The maximum permissible draft in any channel is subject to change should conditions so warrant. (For current information on permissible drafts through the St. Lawrence Seaway, consult the Seaway Notices.)

(13) The maximum overall length and extreme breadth authorized in the Seaway locks is 730 feet (222.5 meters) and 76 feet (23.2 meters), respectively. The maximum height authorized in the Seaway is 116½ feet (35.5 meters) above the water. (For complete information on vessel dimension restrictions, refer to the Seaway Handbook,

(14) **Speed restrictions.**–The St. Lawrence Seaway waters of the St. Lawrence River are a controlled speed area. The speed limits in U.S. waters are in accordance with **33 CFR 401.** (See **33 CFR 401**, chapter 2.)

(15) The maximum speeds for vessels in excess of 40 feet (12.2 meters) in length are in effect in the following areas unless otherwise indicated through Seaway Notices:

(16) Upper Entrance South Shore Canal to Lake St. Louis (Buoy A13), 10.5 knots;

(17) Lake St. Louis (Buoy A13) to Lower Entrance Lower Beauharnois Lock, 16 knots;

(18) Upper Entrance Upper Beauharnois Lock to Lake St. Francis (Buoy D3), 9 knots upbound and 10.5 knots downbound; Lake St. Francis (Buoy D3) to Lake St. Francis (Buoy D49), 16 knots;

(19) Lake St. Francis (Buoy D49) to Snell Lock, 8.5 knots upbound, and 10.5 knots downbound;

(20) Eisenhower Lock to Richards Point (Light 55), 11.5 knots;

(21) Richards Point (Light 55) to Morrisburg (Buoy 84), 13 knots;

(22) Morrisburg (Buoy 84) to Ogden Island (Buoy 99), 11.5 knots;

(23) Ogden Island (Buoy 99) to Blind Bay (0.5 statute mile (0.4 nm) east of Buoy 162), 13 knots;

(24) Blind Bay (0.5 statute mile (0.4 nm) east of Buoy 162) to Deer Island (Light 186), 11.5 knots;

(25) Deer Island (Light 186) to Bartlett Point (Light 227), 8.5 knots upbound and 10.5 knots downbound;

(26) Bartlett Point (Light 227) to Tibbetts Point, 13 knots;

## Structures across the St. Lawrence River
### **Miles above Quebec Bridge*
### ***Clear width in feet proceeding upstream*

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Low | High | |
| 1 | Quebec Bridge | Highway & Railroad | 0.0 | | | 760 | | 150 | Fixed. |
| 2 | Overhead cables | Power | 0.1 | | | | | 158 | |
| 3 | Pierre Laporte Bridge | Highway | 0.1 | | | | | 150 | Fixed. |
| 4 | Overhead cables | Power | 0.3 | | | | | 170 | |
| 5 | Overhead cables | Power | 73.7 | | | | | 160 | |
| 6 | Laviolette Bridge | Highway | 74.5 | | | | | 150 | Fixed. |
| 7 | Overhead cables | Power | 109.0 | | | | 166 | | |
| 8 | Overhead cables | Power | 142.1 | | | | 165 | | |
| 9 | Overhead cable | Power | 147.6 | | | | 165 | | |
| 10 | Jacques Cartier Bridge | Highway | 152.0 | | | 200 | 120 | | Fixed. |
| 11 | Overhead cables | Power | 153.7 | | | | 210 | | |
| 12 | Victoria Bridge | Highway & Railroad | 153.8 | | | 80 | 120 | | Vertical lift. |
| | Lambert Lock | | 153.9 | | | | | | |
| 13 | Victoria Diversion bridge | Highway & Railroad | 154.0 | | | 80 | 120 | | Vertical lift. |
| 14 | Champlain Bridge | Highway | 155.8 | | | 300 | 120 | | Fixed. |
| | Cote St. Catherine Lock | | 162.2 | | | | | | |
| 15 | Cote St. Catherine Bridge | Highway | 162.3 | | | 80 | | | Rolling lift. |
| 16 | Overhead cables | | 165.0 | | | | 120 | | |
| 17 | Overhead cables | | 165.2 | | | | 120 | | |
| 18 | Overhead cables | | 165.3 | | | | 120 | | |
| 19 | Honore Mercier Bridge | Highway | 166.9 | | | 250 | 120 | | Fixed. |
| 20 | Overhead cable | Power | 167.0 | | | | 120 | | |
| 21 | Canadian Pacific Ry. bridge | Railroad | 167.1 | | | 250 | 120 | | Vertical lift. |
| | Beauharnois Lock | | 182.2 | | | | | | |
| 22 | Overhead cables | Power | 182.3 | | | | 120 | | |
| 23 | Overhead cable | Power | 182.6 | | | | 120 | | |
| 24 | Overhead cable | Power | 182.7 | | | | 120 | | |
| | Melocheville Lock | | 183.2 | | | | | | |
| 25 | ConRail bridge | Railroad | 183.3 | | | 80 | | | Swing. |
| 26 | St. Louis Bridge | Highway & Railroad | 189.5 | | | 175 | 120 | | Vertical lift. Clearance down 14 feet. |
| 27 | Valleyfield Bridge | Highway & Railroad | 195.1 | | | 180 | 120 | | Vertical lift. Clearance down 10 feet. |
| 28 | Seaway International Bridge | Highway | 231.7 | | | 600 | 122 | | Fixed. |
| | Bertrand H. Snell Lock | | 233.5 | | | | | | |
| 29 | Overhead cables | Power | 234.6 | | | | 140 | | |
| | Dwight D. Eisenhower Lock | | 237.1 | | | | | | |
| 30 | Iroquois Lock Bridge | Highway | 262.3 | | | | | | Rolling lift. |
| | Iroquois Lock | | 262.4 | | | | | | |
| 31 | Ogdensburg-Prescott Bridge | Highway | 272.3 | | | 1,150 | 129 | | Suspension. |
| 32 | Thousand Islands Bridge | Highway | 311.9 | | | 800 | 152 | | Suspension. |

(27) Junction of Canadian Middle Channel and Main Channel abreast of Ironsides Island to open waters between Wolfe and Howe Islands through the said Middle Channel, 9.5 knots;

(28) Port Robinson to Ramey's Bend through the Welland By-Pass, 8 knots;

(29) All other canals, 6 knots;

(30) **Fluctuations of water level.**–The water levels of the various reaches of the St. Lawrence River are fairly constant. Some variations from normal may occur at the power dams. A wind blowing constantly from one direction may cause a short-term fluctuation of up to about 2 feet (about 0.6 meter) above or below normal.

(31) When water levels at the Kingston, Ont., or Ogdensburg, N.Y., gages fall below Low Water Datum, the traffic control stations broadcast low water warnings. These broadcasts are made every two hours until the levels return above Low Water Datum.

(32) **Currents, St. Lawrence River.**–The current velocities in the St. Lawrence River are varied depending on the reach or channel, and the time of year, e.g., spring thaws. From Montreal to Ogdensburg, N.Y., the maximum velocity in the navigation channels is generally about 2.3 knots. From Ogdensburg to Lake Ontario, the fall of the river is only 1 foot (0.3 meter) and the current velocity in many channels is less than 0.6 knot.

(33) **Weather, The St. Lawrence River.**–The deep, narrow St. Lawrence River Valley can channel, deflect, intensify, or reduce the prevailing winds. As might be expected from the orientation of the valley, winds blow frequently from SW and NE, particularly strong winds. Extremes, usually from these directions, have been clocked at 40 to 60 knots. Strong northeasterlies are often generated by lows that pass to the S or those that traverse the Great Lakes region when a high lingers in the Gulf of St. Lawrence. Downriver winds, from the SW to W, prevail in the wake of these storms. An intense storm along the Atlantic coast will usually generate N to NW winds along the upper St. Lawrence River, which is somewhat sheltered by the hills to the N. Gales are most likely from November through April. Summer windspeeds usually average less than 9 knots; speeds of 17 knots or more occur less than 10 percent of the time. Occasional strong winds are usually associated with thunderstorm gusts. Summer winds rarely blow up river. Southwesterlies and westerlies prevail.

(34) Fog, precipitation, haze, and smoke all can reduce visibilities. Fog is the most common and usually the most restrictive. Along this portion of the St. Lawrence River, fog (visibilities less than 1,100 yards (1,000 meters)) occurs on about 25 days each year, mainly from fall through spring. It often forms on cool, calm, clear nights onshore and drifts out over the water. It usually burns off by noon. Sometimes in spring, warm air moving over the cold river will create a dense, persistent fog. However, this is more common over the wider lower St. Lawrence River. Smoke from brushfires in September and October can reduce visibilities. Visibility may also be briefly restricted below 2 statute miles (1.7 nm) by rain or snow.

(35) **Ice.**–Before the closing of the St. Lawrence Seaway and after its spring opening, some typical river ice may be encountered. Shore-fast ice begins to form in December, and its main outlines are established by early January. The formation spreads upstream from St. Regis. Drift ice is sometimes found in the shipping channels toward the end of the navigation season and the beginning of the new one. The ice begins to melt, usually in early March, near the entrance to Lake Ontario. There is a gradual clearing of shipping lanes and the whole area is normally free of ice by the end of April.

(36) **Pilotage.**–The waters of the St. Lawrence River described in this chapter are Great Lakes designated waters. All registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for the reach from St. Regis to Lake Ontario are supplied by the Great Lakes Pilotage Authority, Ltd., Cornwall, and the St. Lawrence Seaway Pilots Association. (See appendix for addresses.) Pilot exchange points are at Snell Lock and off Cape Vincent, N.Y. (See Pilotage, chapter 3, and **46 CFR 401,** chapter 2.)

(37) **Chart 14761.**–The **International boundary** between the United States and Canada extends from E and intersects the St. Lawrence River at **St. Regis, Que.,** opposite the lower end of Cornwall Island, about 116 statute miles (100.8 nm) below the head of the river at Lake Ontario. In this chapter, for a detailed description of Canadian waters, consult **Canadian Sailing Directions, CEN301, St. Lawrence River.**

(38) **Chart Datum, St. Lawrence River, above Summerstown and below Snell Lock.**–The depths are referred to the sloping surface of the river when the gage at **Summerstown,** Ontario, 6.5 statute miles (5.6 nm) below Cornwall Island, reads 151.6 feet (46.24 meters) and the gage at Pollys Gut, just below Snell Lock, reads 152.9 feet (46.61 meters). These elevations are above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

(39) The main vessel route in this section of the river extends from Lac Saint-Francois on the N side of Ile Saint-Regis and thence between the W end of Ile Saint-Regis and the E end of **Cornwall Island.** Here the vessel route enters United States waters for the first time and in the remainder of the river follows deep water without regard to the International boundary.

(40) **Calling-in point.**–Upbound vessels shall contact "Seaway Eisenhower" on VHF-FM channel 12 when approximately abeam of the lower end of Cornwall Island. After initial contact, vessels shall guard VHF-FM channel 12. (See the Seaway Handbook for details.)

(41) The vessel route extends along the S side of Cornwall Island to Snell Lock at the E end of Wiley-Dondero Canal.

(42) **Currents, St. Lawrence River.**-In August 1977, the following currents were determined in the area just below Snell Lock:

(43) out of Pollys Gut 1.1 to 2.4 knots,

(44) the channel between Pollys Gut and the Seaway International Bridge 1.0 to 3.4 knots,

(45) and at the bridge 2.4 to 3.4 knots.

(46) These values came from a St. Lawrence Seaway Development Corporation study.

(47) **Cornwall, Ont.** is a city on the N side of the river N of Cornwall Island.

(48) The following is extracted (partial) from **Canadian Sailing Directions CEN301, St. Lawrence River, Chapter 1.** It is to be noted that the units of miles are nautical miles.

(49) *The city of* ***Cornwall****, with a population of 47,137 (1991), is on the north shore of the St. Lawrence River, north of Cornwall Island. There are several industrial plants in the city. Cornwall has bus and rail services. Highway 401 is 3 km north of the harbour. The St. Lawrence Seaway Authority have their operating headquarters in Cornwall. The distance by the Seaway channel from Montreal is 69 miles.*

(50) *The harbour at Cornwall is a public harbour administered by the Department of Transport.*

(51) *Cornwall is a* ***Customs*** *port of entry. Vessels bound for Cornwall from foreign ports may request pratique by radio from the Quarantine Station, Montreal.*

(52) *Cornwall wharf, 575 feet (175 m) long with a depth of 27 feet (8.2 m) in 1994, is south of the Cornwall Industrial Development Corporation buildings. This wharf is operated by the Department of Transport. Tugs are not normally required for berthing; with sufficient notice, tugs can be available for emergency or standby use. A transit shed on Cornwall wharf has 11,340 square feet (1,055 m2) of storage space for general cargo.*

(53) **Raquette River** flows into the S side of the St. Lawrence River near lower end of Cornwall Island. The river has depths of 12 feet (10.4 meters) at the mouth, but shoals rapidly to 2 feet (1.7 meters) and has several small islands and a submerged crib within 0.7 statute mile (0.6 nm) of the mouth.

(54) **Calling-in point.**–Upbound vessels shall contact "Seaway Eisenhower" on VHF-FM channel 12 when about 0.5 statute mile (0.4 nm) below Seaway International Bridge. After initial contact, vessels shall guard VHF-FM channel 12. (See the Seaway Handbook for details.)

(55) **Grass River** flows into the S side of the St. Lawrence River just below the E end of Wiley-Dondero Canal. The river is navigable for about 6.5 statute miles (5.6 nm) to the junction with Massena Canal, but is obstructed by numerous boulders near the junction. The three bridges that cross the river below the junction have a least clearance of 39 feet (11.9 meters).

(56) **Wiley-Dondero Canal,** cut in part through the U.S. mainland, extends from just W of the mouth of Grass River W for about 10 statute miles (8.7 nm) past the **Long Sault Islands** to the vicinity of the **Croil Islands.** The canal, with its two locks, serves to raise vessels from the level of Lac Saint-Francois to that of Lake St. Lawrence. **Bertrand H. Snell Lock,** at the E end of the canal, has a normal lift of 45 to 49 feet (13.7 to 14.9 meters). **Dwight D. Eisenhower Lock,** 3.5 statute miles (3 nm) W of Snell Lock, has a normal lift of 38 to 42 feet (11.6 to 12.8 meters).

(57) A **speed limit** of 7 mph is enforced in the canal between Eisenhower and Snell Locks.

(58) **Calling-in point.**–Downbound vessels shall contact "Seaway Eisenhower" on VHF-FM channel 12 when approximately abeam of the central island of the Croil Islands. After initial contact, vessels shall guard VHF-FM channel 12. (See the Seaway Handbook for details.)

(59) **Currents, Wiley-Dondero Canal.**–Crosscurrents with velocities to 2 knots have been reported in the Wiley-Dondero Canal. These currents set NE along the lower end of the Long Sault Islands and ESE at the upper end of the islands.

(60) Standby areas for small craft awaiting transit through the locks are on the S side of the canal just W of Snell Lock and just E of Eisenhower Lock. The areas are each marked by a buoy. Mooring cells for deep-draft vessels awaiting transit are on the S side of the canal 0.9 statute mile (0.8 nm) W of Snell Lock, 1.1 statute miles (1 nm) E of Eisenhower Lock, and 1.6 statute miles (1.4 nm) W of Eisenhower Lock. Each set of mooring cells is marked at each end by a light, and all but the latter have a catwalk.

(61) **Lake St. Lawrence** is contained by Eisenhower Lock and by two dams. **Moses-Saunders Power Dam,** 3 statute miles (2.6 nm) NE of the lock, extends from the E end of **Barnhart Island** across the International boundary to the Canadian mainland. **Long Sault Spillway Dam** connects the mainland N of Eisenhower Lock to the W end of Barnhart Island. The dam has thirty 50-foot-wide (15.2-meter-wide) vertical gates. All vessels are cautioned not to approach either dam within 1,000 feet (about 300 meters).

(62) **Chart Datum, St. Lawrence River, Eisenhower Lock to Iroquois Lock.**–Depths between Eisenhower Lock and Iroquois Lock are referred to the sloping surface of the river when the gauge above Eisenhower Lock reads 237.9 feet (72.50 meters) and the gauge below Iroquois Lock reads 240.1 feet (73.18 meters). These elevations are above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

(63) A marina in a basin on the NW side of Barnhart Island provides gasoline, diesel fuel by truck, ice, sewage pump-out, some marine supplies, and a launching ramp. In 1977, depths of 4 to 8 feet were reported alongside. A marina on the Canadian shore 2.4 statute miles (2.1 nm) NW has electricity, gasoline, diesel fuel, marine supplies, sewage pump-out, water, ice, and a mobile lift and marine railways that can handle craft to 50 tons or 55 feet (16.8 meters) long for hull and engine repairs.

(64) **Massena Canal,** a former power canal, extends SE from the St. Lawrence River near the upper end of the Long Sault Islands for 2.8 statute miles (2.4 nm) to the junction with Grass River. The canal is closed to navigation by a dam at either end. **Massena, N.Y.,** at the junction of Massena Canal and Grass River, is the site of the field headquarters of the Saint Lawrence Seaway Development Corporation. (See appendix for address.)

(65) The Coast Guard maintains a **Marine Safety Detachment** office in Massena. (See appendix for address.)

(66) Massena is a **customs port of entry.**

(67) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(68) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(69) **Wharf.**–Metropolitan Petroleum Co., Inc. receives petroleum products at a wharf on the S side of Wiley-Dondero Canal in 44°57′57″N., 74°55′05″W. The wharf has 650 feet of berthing space with dolphins and a depth of 30 feet alongside in 1977.

(70) **Chart 14762.**–Coming out of Wiley-Dondero Canal on the S side of Croil Islands, the vessel route turns SW on the S side of **Cat Island** and **Cat Island Shoal,** thence N of **Wilson Hill Island,** S of **Weaver Shoal,** N of **Bradford Island, Crysler Shoal,** and **Goose Neck Island Shoals,** between **Doran Shoal** on the E and **Broder Island** on the W, and N of **Murphy Islands** and **Murphy Shoal** to the vicinity of Morrisburg, Ont.

(71) The light marking the N side of the Crysler Shoal is equipped with a racon.

(72) About 1.5 statute miles (1.3 nm) SSW of Crysler Shoal, a channel leads S to a marina. The marina provides gasoline, diesel fuel by truck, water, ice, electricity, sewage pump-out, some marine supplies, and a launching ramp. A 10-ton lift is available for hull and engine repairs. In 1977, depths of 4 to 8 feet were reported alongside the berths.

(73) **Calling-in point.**–Upbound vessels shall contact "Seaway Iroquois" on VHF-FM channel 11 and downbound vessels shall contact "Seaway Eisenhower" on VHF-FM channel 12 when approximately abeam of Bradford Island. After initial contact, vessels shall guard VHF-FM channels 11 (upbound) and 12 (downbound). (See the Seaway Handbook for details.)

(74) **Anchorage.**–A designated anchorage is on the N side of the vessel route opposite Wilson Hill Island, between Weaver Shoal and Cat Island Shoal. The NW limit of the anchorage is marked by lighted buoys. Mariners are cautioned against anchor-

ing near a wreck, covered 47 feet (14.3 meters), near the W end of the anchorage.

(75) **Morrisburg, Ont.,** is a town on the N side of the St. Lawrence River, 17 statute miles (14.8 nm) above Eisenhower Lock.

(76) The following is extracted (partial) from **Canadian Sailing Directions CEN301, St. Lawrence River, Chapter 1**. It is to be noted that the units of miles are nautical miles.

(77) *The village of **Morrisburg**, with a population of 2,429 (1991), is on the north shore opposite the **Murphy Islands** (44°54'N., 75°11'W.), which are wooded.*

(78) *The United Church spire, near the shore, and the silver water tower, 50 m (165 ft) in elevation, behind the town, are conspicuous.*

(79) *An L-shaped **Public wharf**, with an end section 33 m (108 ft) long, extends 23 m (75 ft) from the shore.*

(80) *Morrisburg Public Wharf and Ramp, at Morrisburg, had depths of 2.1 m (7 ft) in 1994 and offered dockage and concrete ramps.*

(81) *Morrisburg Boat Docks Park, east of the Public wharf, in 1994 offered washrooms, picnic tables, tennis courts, pay phone, drinking water, showers, children's playground and supervised swimming beach.*

(82) From Morrisburg, the vessel route continues SW between **Canada Island** and **Clark Island Shoal,** thence follows close to the Canadian shoreline around the N side of **Ogden Island** and continues SW for about 4 statute miles (3.5 nm) to Iroquois Lock.

(83) **Currents, St. Lawrence River**.–In August 1976, currents in the main channel in the Ogden Island reach were determined to be from 2.4 to 2.7 knots. The current sets N immediately E of Canada Island. An E set into Little River may be felt at the upper end of Ogden Island.

(84) **Waddington, N.Y.,** is a village on the S side of **Little River,** the channel of the St Lawrence River S of Ogden Island. The village wharf had a reported depth of 27 feet alongside in 1977.

(85) **Calling-in point.**–Upbound vessels shall contact "Seaway Iroquois" on VHF-FM channel 11 when approximately abeam of the upper end of Ogden Island. After initial contact, vessels shall guard VHF-FM channel 11. (See the Seaway Handbook for details.)

(86) **Chart 14763.–Iroquois, Ont.,** is a village on the NW side of the river about 7 statute miles (6.1 nm) above Morrisburg and 13 statute miles (11.3 nm) below Ogdensburg. **Iroquois Dam,** just above the village, extends from **Rockway Point** on the United States shore to **Harkness Island** on the Canadian side. The 2,700-foot-long (823 meter-long) dam is a buttressed gravity structure with 32 openings, each with a vertical-lift gate. **Iroquois Lock,** with a lift of 0.5 to 6 feet (0.1 to 1.8 meters), is between the W side of Harkness Island and Iroquois Island and provides a passage around the dam.

(87) Small pleasure craft may, at their own risk, pass through the portals of Iroquois Dam when the gates are fully open. A minimum overhead clearance of 8½ feet (2.6 meters) is provided through sluice No. 28 for downbound passage and through sluice No. 30 for upbound passage. The piers of sluice No. 28 are painted with the standard red and black channel markings on the upstream side of the dam, and the piers of sluice No. 30 are marked similarly on the downstream side of the dam.

(88) **Caution.**–Although the dam is usually operated in a fully open position, some or all of the gates may be closed or partially closed without prior notice. The Seaway Authority advises that small craft passing through the dam sluices are outside of the Authority's jurisdiction and that it is not responsible for any damage resulting from the use of these facilities.

(89) **Chart Datum, St. Lawrence River above Iroquois Dam.**–Depths above Iroquois Dam are referred to the sloping surface of the river when the gage above Iroquois Lock reads 240.3 feet (73.24 meters) and Lake Ontario is at Low Water Datum, elevation 243.3 feet (74.2 meters). These elevations are above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

(90) The upbound channel coming out of Iroquois Lock is marked by a **205°48'** leading light on **Sparrowhawk Point.** The vessel route leads S of **Toussaint Island,** thence N of **Galop Island, Chimney Island,** and **Chimney Point** to Ogdensburg, N.Y. **Old Galop Canal,** now closed to navigation, follows the Canadian shore from just below Iroquois Lock upstream for about 7 statute miles (6.1 nm). **North Channel,** the upper entrance to Old Galop Canal, is N of Chimney Island, between **Drummond Island** and **Spencer Island.**

(91) **Currents, St. Lawrence River.**–River currents between Iroquois and Ogdensburg are generally about 2 knots. The current has a N set at the upper end of Galop Island and an E set just below Ogdensburg-Prescott Bridge. In 1976, currents between **Cardinal, Ont.** and **Chimney Point** were determined as follows:

(92) August 2.3 to 3.1 knots,

(93) November 2.4 to 3.1 knots,

(94) December 1.7 to 2.8 knots.

(95) Two small marinas on the U.S. shore behind Galop Island provide gasoline, diesel fuel, water, ice, electricity, some marine supplies, launching ramps, and repairs to trailerable craft.

(96) **Calling-in point.**–Downbound vessels shall contact "Seaway Iroquois" on VHF-FM channel 11 when approximately abeam of the lower end of Galop Island. After initial contact, vessels shall guard VHF-FM channel 11. (See the Seaway Handbook for details.)

(97) **Ice booms.**–An ice boom extends from the SW end of Galop Island across the navigational channel to the S end of **Lame Squaw Island** during the non-navigation season. The 400-foot (122-meter) section across the channel is marked by lights. The connected logs that form the boom are anchored to the river bottom through a series of anchors and cables that extend about 500 feet (about 150 meters) upstream. The ice boom may be opened when required for movement of vessels. Other ice booms with similar anchorages, but not across the navigation channel, are on the W side of Chimney Point and between the U.S. mainland and Galop Island.

(98) Ogdensburg-Prescott Bridge, a suspension span with a clearance of 129 feet (39.3 meters) across the ship channel, crosses the St. Lawrence River 10 ststute miles (8.7 nm) above the Iroquois Lock. The N and S piers of the bridge are equipped with a racon.

(99) In December 1980, a ship's anchor was reported about 0.5 statute mile (0.4 nm) above the Ogdensburg-Prescott Bridge in about 44°43'48"N., 75°28'03"W.

(100) **Lower Lakes Terminal.**–The following is extracted (partial) from **Canadian Sailing Directions CEN301, St. Lawrence River, Chapter 2**. It is to be noted that the units of miles are nautical miles.

(101) **Canada Ports Corporation Lower Lakes Terminal** *(44°44'N., 75°28'W.), on the NW shore 0.5 mile upstream of the bridge, is a major trans-shipment point for grain. In 1993, 25 ships used the port.*

(102) *This terminal is administered and operated by Ports Canada; vessels using these facilities are subject to the Canada Ports Corporation Operating By-law. A copy of the By-law may be obtained from the Operations Manager, Ports Canada Facilities, Prescott, Ontario.*

(103) *Lower Lakes Terminal Sector light (312), shown from the side of the grain elevator at the terminal, has a fluorescent-orange rectangular daymark. The white sector indicates the preferred channel.*

(104) *The Ports Canada grain elevator at the Lower Lakes Terminal has a capacity of 154,020 tonnes of grain. It is a long narrow structure with unloading facilities for large lake vessels on one side and loading facilities on the other. Railway car loading facilities are at the inshore end of the elevator. The railway yard has space for 125 cars.*

(105) *The unloading berth, slip B, north of the elevator, is 340 m (1,115 ft) long, with a depth of 7.9 m (26 ft). It will accommodate two large lake vessels. Three travelling marine towers unload vessels; each tower has a capacity of 980 tonnes of grain per hour. The loading berth, slip A, south of the elevator, is 274 m (900 ft) long and had a depth of 7.6 m (25 ft) in 1992. This berth is equipped with eleven spouts for loading grain. There is also berthing space for vessels waiting to load or unload. For the loading of railway cars or trucks, there are four elevator legs with a capacity of 476 tonnes per hour. The wharves have an elevation of 2.7 m (9 ft).*

(106) *There is an open stockpile area of 5,580 m2 (60,000 sq. ft.) on the north pier for the storage of salt and nitrates. There is an open stockpile area of 2,415 m2 (26,000 sq. ft.) on the south pier.*

(107) ***Caution.**–In 1994, there was a submerged obstruction 23 m (75 ft) east of the NE corner of the jetty on the south side of slip A. This obstruction is a pile or metal object, submerged by 7.7 m (25 ft).*

(108) *Pilots and tugs are available for berthing at the Lower Lakes Terminal; pilots require four hours notice.*

(109) **Chart 14764.–Ogdensburg, N.Y.,** is a town and harbor on the SE side of the St. Lawrence River about 42 statute miles (36.5 nm) above Snell Lock and 62 statute miles (53.9 nm) below Lake Ontario. The harborfront is separated from the main river channel by an extensive shoal bank. The **Oswegatchie River** enters the St. Lawrence River near the upper end of the harbor.

(110) **Channels.**–Entering from the St. Lawrence River, the upper entrance to the harbor is through a dredged channel leading to the mouth of the Oswegatchie River, thence upstream to just below the third highway bridge. The harbor's lower entrance is through the turning basin at the E end of the harbor and thence through the city-front channel to the mouth of the Oswegatchie River. The channel limits are marked by lighted and unlighted buoys.

(111) In September 1998, the controlling depths were 17 feet in the upper entrance channel, thence 18 feet in the city-front channel to the Port Authority Marine Terminal, except along the sides, thence 25 feet in the lower extrance channel, except along the W edge, thence general depths of 18 to 20 feet in the turning basin with lesser depths near the S edge. In September 1998, the controlling depth in Oswegatchie River entrance was 15 feet to near the project limit below the third highway bridge. Above the project limit, depths are less than 4 feet for 0.3 statute mile (0.3 nm) to the dam.

(112) **Caution.**–Ruins of a ferry pier extend from shore on the W side of the upper entrance channel. A private lighted buoy marks the outer end of the ruins.

(113) **Bridges.**–Fixed highway bridges crossing Oswegatchie River 0.6, 0.63, and 0.7 statute mile (0.5, 0.55, and 0.6 nm) above the entrance have a least clearance of 15 feet (4.6 meters).

(114) Ogdensburg is a **customs port of entry.**

(115) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(116) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(117) **Wharf.–Ogdensburg Bridge and Port Authority Marine Terminal:** (44°42′32″N., 75°29′11″W.); 600-foot face; 27 feet alongside; deck height, about 12 feet (3.7 meters); 52,000 square feet (4,831 square meters) covered storage; 8 acres open storage; 20-ton crane; water and electrical shore-power connections; pipelines extend to storage tanks; receipt and shipment of general and bulk cargo; receipt of petroleum products; owned and operated by Ogdensburg Bridge and Port Authority.

(118) **Supplies.**–Diesel oil, water, provisions, and some marine supplies are available at Ogdensburg.

(119) **Small-craft facilities.**–The 300-foot (91.4 meters) city dock had a reported depth of 17 feet alongside in 1977. Use of the dock is limited to pleasure craft. Several marinas at Ogdensburg provide transient berths, gasoline, water, ice, electricity, some marine supplies, a sewage pump-out facility, and launching ramps.

(120) **Ice boom.**–An ice boom extends from shore just above Ogdensburg across the river to Prescott, Ont., during the non-navigation season. A 400-foot (121.9 meters) section across the navigation channel is marked by lights. The connected logs that form the boom are anchored to the river bottom by a series of anchors and cables that extend about 500 feet (152.4 meters) upstream. The ice boom may be opened when required for movement of vessels.

(121) **Prescott, Ont.,** is a town on the NW side of the river opposite Ogdensburg.

(122) The following is extracted (partial) from **Canadian Sailing Directions CEN301, St. Lawrence River, Chapter 2**. It is to be noted that the units of miles are nautical miles.

(123) *The town of **Prescott**, with a population of 4,512 (1991), is on the NW shore 3 miles upstream of the suspension bridge. Prescott has rail and bus services. By the Seaway channel, Prescott is 110 miles from Montreal.*

(124) *Prescott is a Customs port of entry.*

(125) *Prescott Anchorage, with 8 anchorage areas, is in the river upstream of Prescott.*

(126) *Anchorage is prohibited in a cable area, 0.5 mile wide, that extends across the river from Prescott to Ogdensburg, NE of the anchorage area.*

(127) *The following objects in Prescott are conspicuous: the blockhouse of Fort Wellington, elevation 29 m (95 ft); the Anglican Church spire, elevation 55 m (180 ft); and a water tower with an elevation of 61 m (200 ft). A grey silo with a red and white top, elevation 45 m (148 ft), is SW of the town.*

(128) *Sandra S. Lawn Harbour Marina, on the NW shore at Prescott, had depths of 2.1 m (7 ft) in 1994 and offered dockage with power and water, pump out, picnic area, pay phone, showers, laundromat, ice, gasoline and diesel fuel, and monitored VHF Channel 68. This marina is an authorized dealer for Canadian Hydrographic Service nautical charts and publications.*

(129) *Prescott Heritage Harbour light (312.5), at the south side of the entrance to the marina, is shown at an elevation of 7.7 m (25 ft) from a white octagonal tower, 6.9 m (23 ft) high.*

(130) *There are several wharves at the town of Prescott. A ruined ferry slip and landfill area at the east end of the Prescott waterfront was under development in 1994. Next along the waterfront, west of the marina, are two wharves which are owned by the town. The first wharf is 66 m (217 ft) long, with a deck elevation of 1.8 m (6 ft). In 1994, there were depths of 3.4 to 5.8 m (11 to 19 ft) along the face. From early May until late September, pleasure craft can berth at this wharf. The second wharf, for the use of pleasure craft, is 76 m (249 ft) long with a deck elevation of 1.8 m (6 ft). In 1994, there were depths of 5.2 to 7.3 m (17 to 24 ft) along the face. Centennial Park, near by, has a launching ramp, swimming pool, tennis courts, sandy beach and swimming area.*

(131) *Along the waterfront at the* ***Prescott Canadian Coast Guard Base*** *there are two wharves, each 100 m (328 ft) long with an elevation of 1.8 m (6 ft). In 1994, there were depths of 4.6 to 5.8 m (15 to 19 ft) at the outer face of the downstream wharf and 3.4 to 5.5 m (11 to 18 ft) at the outer face of the upstream wharf; the basin between the two wharves had depths of 1.8 to 3.7 m (6 to 12 ft). There is a depot for the storage and refitting of buoys; and there is a helicopter hangar near the downstream wharf.*

(132) *The shore property for 305 m (1,000 ft) upstream of the Canadian Coast Guard Base is the municipal Centennial of Confederation Prescott Community Park. In 1994, facilities included an excellent concrete launching ramp, picnic area, swimming pool, river-side swimming area, tennis courts, children's playground, drinking water and showers.*

(133) ***Caution.****–Mariners and small-craft operators are cautioned that the wash from passing ships may cause an uncomfortable surge at the Prescott wharves.*

(134) *The testing of various aids to navigation may be heard and seen in the vicinity of the Prescott Canadian Coast Guard Base. Mariners should not confuse aids being tested with the standard channel aids.*

(135) *A* ***submerged water intake*** *0.16 mile upstream of the Canadian Coast Guard Base extends 90 m (295 ft) offshore; the crib at the outer end has a depth of 5.2 m (17 ft).*

(136) **Anchorage.**–A designated anchorage just above Ogdensburg and Prescott has depths of 7 to 10 fathoms, clay and shingle bottom. A cable area crosses the river between the two cities at the lower end of the anchorage.

(137) Above Ogdensburg the river is deep and wide for about 10.5 statute miles (9.1 nm) to the **Three Sisters Islands,** and the vessel route follows a general midriver course. **Catamaran Shoal,** covered 12 feet (3.7 meters), is marked on the N side by a buoy about 8 statute miles (7 nm) above Ogdensburg. At the Three Sisters Islands, the vessel route extends between **McNair Island** and **North McNair Shoal.** The shoal has a least depth of 14 feet (4.3 meters) and is marked on the S side by a buoy.

(138) **Calling-in point.**–Downbound vessels shall contact "Seaway Iroquois" on VHF-FM channel 11 when about 1.5 statute miles (1.3 nm) below Catamaran Shoal. After initial contact, vessels shall guard VHF-FM channel 11. (See the Seaway Handbook for details.)

(139) **Charts 14764, 14770.–Morristown, N.Y.,** is a village and small-craft harbor on a small inlet on the SE side of the river opposite the Three Sisters Islands.

(140) **Channels.**–A dredged channel leads from the St. Lawrence River into the inlet to 250 feet (76.2 meters) below the highway bridge that crosses it. In 1964, the controlling depth was 7 feet.

(141) **Small-craft facilities.**–A public dock and launching ramp are on the E side of the inlet. In 1977, a depth of 10 feet (3 meters) was reported alongside the dock. Two marinas at Morristown provide transient berths, gasoline, diesel fuel by truck, water, ice, electricity, sewage pump-out, some marine supplies, and a launching ramp. A 5-ton mobile lift is available for hull and gasoline engine repairs.

(142) **Brockville, Ont.**–The following is extracted (partial) from **Canadian Sailing Directions CEN301, St. Lawrence River, Chapter 2.** It is to be noted that the units of miles are nautical miles.

(143) *The city of* ***Brockville****, with a population of 21,582 (1991), is on the NW shore 10 miles SW of Prescott. The downstream limit of the harbour is 0.1 mile SW of McNair Island; the upstream limit is near* ***Smith Island*** *and* ***Refugee Island*** *(44°34′N., 75°42′W.). Brockville has bus and rail services. By the Seaway channel, Brockville is 119 miles from Montreal.*

(144) *Brockville is a* ***Customs vessel reporting station*** *for pleasure craft.*

(145) **Blockhouse Island**, *connected to the mainland by a landfill area at its NE end, is a municipal park.* ***Tunnel Bay*** *is the inner end of the basin protected by Blockhouse Island.*

(146) *A* ***submerged water intake*** *0.3 mile NE of Blockhouse Island extends 220 m (722 ft) offshore.*

(147) *The Blockhouse Island jetty (44°35′N., 75°41′W.) extends SW from Blockhouse Island.* ***Brockville Public wharf****, on the Blockhouse Island jetty, is 142 m (466 ft) long and had depths of 0.6 to 3 m (2 to 10 ft) in 1994. Facilities included dockage with power and water, picnic area, pay phones and ice. There is a* ***customs office*** *on the Public wharf.*

(148) ***Landmarks.****–A Golden Hawk aerobatic jet plane mounted on a pedestal on this wharf is prominent. The town clock tower, elevation 42 m (138 ft), is north of Blockhouse Island. A water tower 0.75 mile NW of the Public Wharf has an elevation 74 m (243 ft).*

(149) The stretch of river from Brockville upstream to Lake Ontario is thickly strewn with large and small islands known as the **Thousand Islands.** No attempt is made here to mention each island and shoal in the group. The nautical charts are the best guide and are a necessity for navigating any portion of this stretch.

(150) **Charts 14764, 14765, 14770.–Brockville Narrows** is a partially dredged reach about 3 statute miles (2.6 nm) long that extends upstream from just above Brockville. The channel leads close to the Canadian shore through a group of islands that fill the river from bank to bank. The channel that parallels Brockville Narrows close to the New York shore is not suitable for deep-draft vessels. Numerous shoal spots of less than 2 feet (0.6 meter) are between the New York shore and the main channel.

(151) **Currents.**–In July 1976, currents in Brockville Narrows were determined to be from 1.3 to 2.4 knots.

(152) **Charts 14765, 14770, 14771.**–Coming out of Brockville Narrows, the vessel route extends SW between **Cole Ferry Shoal** and **Cole Shoal.** This reach is marked at the lower end by a **036°55′** lighted range. At **Whaleback Shoal,** about 3 statute miles (2.6 nm) above Brockville Narrows, the vessel route turns SSW for 2.5 statute miles (2.2 nm) on the E side of **Bay State Shoal** and **Crossover Island.** This reach is marked by a **013½°** lighted range and by Chippewa Point Directional Light at the lower and upper end, respectively.

(153) **Anchorage.**–A designated anchorage marked by buoys is on the W side of the vessel route abreast the turn at Whaleback Shoal.

(154) **Calling-in point.**–Upbound vessels shall contact "Seaway Clayton" on VHF-FM channel 13 and downbound vessels shall contact "Seaway Iroquois" on VHF-FM channel 11 when approximately abeam of Crossover Island. After initial contact, vessels shall guard VHF-FM channels 13 (upbound) and 11 (downbound). (See the Seaway Handbook for details.)

(155) A natural deepwater channel marked by lights and buoys leads SW from the turn at Whaleback Shoal and roughly follows the Canadian shore N of **Grenadier Island.**

(156) **Oak Point, N.Y.,** is a small summer resort on the SE side of the river 2.4 statute miles (2.1 nm) above the upper end of Brockville Narrows. Boats drawing not more than 6 feet (1.8 meters) can land here, but caution is advised to avoid the shoals and small islands in the landing approach.

(157) **Blind Bay** is a small inlet just E of Chippewa Point Directional Light. A sign marks the E side of the entrance. Several overhead cables with a reported least clearance of 28 feet (8.5 meters) cross the entrance channel. In 1977, a reported depth of 4 feet could be carried along the N shore to a marina in the NE corner. Some marine supplies and gasoline engine repairs are available.

(158) **Charts 14765, 14771.**–From Blind Bay, the vessel route follows a series of short reaches across the mouth of Chippewa Bay and passes NW of **Superior Shoal,** SE of **Jorstadt Island,** NW of **Haskell Shoal,** thence SE of Grenadier Island on the SE sides of **Empire Shoal** and **Sister Island Shoal,** NW of **Third Brother Island,** and SE of **Lone Brother Island.**

(159) **Chippewa Bay,** on the SE side of the river, is enclosed by **Chippewa Point, Cedar Island,** and **Oak Island.** The bay is filled with numerous small islands, rocks, and shoals; local knowledge is advised. **Chippewa Bay, N.Y.,** a village on the E side of the bay, can be reached by boats drawing 4 feet. **Schermerhorns Landing,** 2.5 statute miles (2.2 nm) SW, has a marina with gasoline, water, ice, electricity, some marine supplies, and a launching ramp. A 5-ton forklift can haul 21-foot (6.4-meter) boats for hull and gasoline engine repairs.

(160) **Charts 14765, 14772.**–From Lone Brother Island, the vessel route continues SW, between **Ironsides Shoal** on the NW and **Ironsides Island** and **Inner Ironsides Shoal** on the SE, thence SE of **Whiskey Island Shoal** off the mouth of Goose Bay.

(161) **Goose Bay** is on the SE side of the St. Lawrence River, SE of Whiskey Island Shoal and the upper end of Grenadier Island. The bay is very shallow and has a mud bottom with numerous rocks.

(162) **Charts 14766, 14767, 14772, 14773, 14774, *1419, *1420, *1438, *1439–Canadian Middle Channel** branches W from the main vessel course at Ironsides Island and leads through the Thousand Islands on the Canadian side of the International boundary, thence between Wolfe Island and Howe Island and into Lake Ontario in the vicinity of Kingston, Ont. The channel is marked by lights and buoys.

(163) **Speed limit.**–There is a speed limit of 9.5 knots (10.9 mph) over the ground for all vessels over 40 feet (12.2 m) in length in the Canadian Middle Channel and adjacent waters.

(164) Above Ironsides Island, Canadian Middle Channel leads past the SW end of Grenadier Island, thence through **Raft Narrows** along the mainland. The main channel through the narrows is crossed by a fixed highway bridge with a clearance of 120 feet. Above the narrows, the channel divides around Wood Island, along the N side upbound and the S side downbound. Thence the channel leads between **Wallace Island** and **Ash Island,** SW past **The Navy Islands,** and through the S part of **The Lake Fleet Islands** to a point N of **The Punts,** thence S of **Leek Island** and into the deep wide water between Wolfe and Howe Islands.

(165) **Charts 14766, 14772.–Rockport, Ont.,** is a small village on the N side of the river at the E end of Raft Narrows.

(166) The following is extracted (partial) from **Canadian Sailing Directions CEN301, St. Lawrence River, Chapter 3.** It is to be noted that the units of miles are nautical miles.

(167) ***Rockport**, population 149 (1981), is on the Canadian mainland 0.4 mile west of Tar Island light.*

(168) *Rockport is a **Customs vessel reporting station** for pleasure craft.*

(169) *A **Canadian Coast Guard Inshore Rescue Boat** is based at Rockport from the end of May to the beginning of September each year, though these dates are subject to change (see information on Search and rescue in Sailing Directions booklet CEN 300 General Information, Great Lakes).*

(170) *At Rockport, there is an L-shaped **Public wharf** with an outer face 13 m (43 ft) wide and depths in 1995 of 3.9 m (13 ft) at the outer face and 2.9 m (10 ft) on each side. Another **Public wharf**, 30 m (98 ft) long and 6.1 m (20 ft) wide, extends in a SW direction from the south end of the waterfront. There are depths of 2.1 to 2.7 m (7 to 9 ft) at the outer end of this wharf. The deck of this wharf has an elevation of 1.8 m (6 ft). There is a public boat launching ramp at Rockport.*

(171) **Ivy Lea, Ont.,** is a small resort village about 1.4 statute miles (1.2 nm) W of the bridge across Raft Narrows.

(172) The following is extracted (partial) from **Canadian Sailing Directions CEN301, St. Lawrence River, Chapter 2.** It is to be noted that the units of miles are nautical miles.

(173) ***Ivy Lea**, population 104 (1981), is a summer resort on the Canadian mainland 0.5 mile NNW of Ash Island.*

(174) *East of Ivy Lea is an L-shaped Public wharf; the outer face is 35 m (115 ft) long with an elevation of 1.5 m (5 ft) and a depth of 0.7 m (2 ft). There is a launching ramp next to the Public wharf.*

(175) *Ivy Lea is a **Customs vessel reporting station** for pleasure craft.*

(176) **Charts 14767, 14774.–Gananoque, Ont.,** is a town at the mouth of **Gananoque River**, about 12 statute miles (10.4 nm) W of Rockport and 18 statute miles (15.6 nm) E of Kingston.

(177) The following is extracted (partial) from **Canadian Sailing Directions CEN301, St. Lawrence River, chapter 3.** It is to be noted that the units of miles are nautical miles.

(178) *The town of **Gananoque**, with a population of 5,209 (1991), is built along both sides of the **Gananoque River**. A swing bridge crosses near the mouth of the river, and a road bridge crosses 0.3 mile upstream. The swing bridge has a vertical clearance of 4.3 m (14 ft) when closed; it is opened only on application to the town authorities. Between the two bridges, the stream is 45 m (148 ft) wide with wooden wharves along both shores. The shore east of the town to Sturdivants Point, 2.5 miles away, rises to an elevation of 12 m (40 ft).*

(179) *Gananoque is a **Customs vessel reporting station** for pleasure craft.*

(180) *There is an L-shaped **Public wharf** 110 m (361 ft) east of the east entrance point of the river. Another **Public wharf**, with a total length of 177 m (581 ft) and an elevation of 1.8 m (6 ft), extends SW along the shore from the mouth of the river.*

(181) **Charts 14768, 14802, *2017.–Kingston Harbour,** serving the city of **Kingston, Ont.,** is on the N side of the head of the St. Lawrence River at the mouth of **Cataraqui River.**

(182) **Rideau Waterway.**–The Rideau Waterway connects the Ottawa River at **Ottawa, Ont.,** with the head of the St. Lawrence River at Kingston. From Ottawa, the waterway follows the **Rideau River** upstream to its source in the **Rideau Lakes,** a distance of 123.5 statute miles (107.3 nm). For description of the Rideau Waterway consult **Canadian Small Craft Guide, Rideau Waterway and Ottawa River.**

(183) **Charts 14766, 14772.**–From Whiskey Island Shoal, the main vessel route leads SW between the **Summerland Group** on the NW and the **Excelsior Group** on the SE. **Deer Island,** close SW of the Summerland Group, is marked on the SE side by a light.

(184) Above Deer Island, the vessel route passes the lower end of **Wellesley Island** and leads SE of the **Manhattan Group, Frontenac Shoal,** and **Pullman Shoal** and NW of **Sunken Rock Island, Sunken Rock Shoal,** and **Cherry Island.**

(185) **Westminster Park, N.Y.,** is a summer resort at the lower end of Wellesley Island. The wharves at the village are in ruins and submerged.

(186) **Alexandria Bay, N.Y.,** is a summer resort village on the SE side of the river opposite the lower end of Wellesley Island. Wharves at the village are easily approached from the river. **Broadway Shoal,** in the approach to the village, has a depth of 13 feet (4 meters) and is marked by a buoy.

(187) Alexandria Bay is a **customs port of entry.**

(188) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(189) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(190) **Alexandria Bay Coast Guard Station** is on the SE side of Wellesley Island about 1,000 feet W of Cherry Island.

(191) **Small-craft facilities.**–Small bays at either end of the village have anchorage for boats drawing 6 to 11 feet (1.8 to 3.4 meters). The 460-foot (140-meter) village dock, about 0.25 statute mile (0.2 nm) NE of Cherry Island, had a reported depth of 7 feet (2.1 meters) alongside in 1977. Marinas at Alexandria Bay provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Mobile lifts to 60 tons and a 15-ton marine railway that can handle 80-foot (24.4 meter) craft are available for hull, engine, and electronic repairs. Machine shops can repair shafts up to 3 inch diameter.

(192) **Charts 14766, 14772, 14773.–American Narrows (Upper Narrows)** separates Wellesley Island from the U.S. mainland for about 6 statute miles (5.2 nm) from Cherry Island SW to the upper end of Wellesley Island. The channel through the narrows is generally deep, has a least width of 450 feet (137 meters), and is well marked by lights and buoys. The channel is bordered throughout its length by small islands and shoals.

(193) The lower entrance to the narrows is marked by a **218°** leading light at the village of Point Vivian, about 1 statute mile (0.9 nm) SW of Cherry Island.

(194) **Currents.**–In July-August 1976, currents from Alexandria Bay to Point Vivian were determined to be from 1.2 to 1.5 knots. In July 1976, the current at the Thousand Islands Bridge was determined to be 2.8 knots.

(195) In 1977, it was reported that the river current often reaches 2 knots in the entrance to the narrows from about 0.3 to 0.8 statute mile (0.3 to 0.7 nm) above Cherry Island and thence 1.5 to 2 knots SW to Swan Bay.

(196) **Swan Bay** and **Brown Bay** are shallow inlets about 2.5 statute miles (2.2 nm) above Cherry Island on the SE and NW sides of the narrows, respectively. During the summer, gasoline is available at a small marina on the NE side of Swan Bay. In 1977, the reported depths were 3 feet (0.9 meter) in the approach and 6 feet (1.8 meter) alongside.

(197) **Thousand Islands Bridge,** a suspension span with a clearance of 150 feet (46.3 meters), crosses the narrows just W of Swan Bay.

(198) **Niagara Shoal,** covered 3 feet and marked on the N side by a lighted buoy, is on the SE side of the narrows 1.5 statute miles (1.3 nm) above the bridge. Coming out of the narrows at the upper end of Wellesley Island, the vessel route passes SE of **Granite State Shoals,** marked by a light, and NW of **Rock Island Reef,** marked by a lighted buoy.

(199) **Fineview, N.Y.,** is a small settlement on Wellesley Island just below Granite State Shoals. A dock at the settlement is suitable for skiffs only because of many rocks off the end. In 1977, the reported depths were less than 2 feet (0.6 meter) alongside.

(200) **Thousand Island Park,** is a private summer resort at the upper end of Wellesley Island. In 1977, the resort dock had a reported depth of 10 feet (3 meters) alongside, but the dock approach from the river channel is narrow and obstructed by numerous rocks.

(201) **Fishers Landing, N.Y.,** is a settlement 0.8 statute mile (0.7 nm) SE of Fineview on the W side of **Mullet Creek Bay.** Several marinas provide transient berths, gasoline, water, ice, electricity, some marine supplies, and launching ramps. Forklifts to 4 tons can haul out 22-foot (6.7 meters) craft for hull and gasoline engine repairs. In 1977, depths of 10 to 15 feet (3 to 4.6 meters) were reported available at the berths.

(202) **Charts 14766, 14773, 14774.**–Above American Narrows, the vessel course is through a wide area of generally deep water. The route passes NW of **Little Round Island** and **North Colborne Island,** marked by a light, thence SE of **Chapman Shoal,** marked by a light and racon, and thence between **Washington Island** to SE and **Calumet Island** to NW.

(203) A marina on the E side of **Spicer Bay,** about 1.2 statute miles (1 nm) E of Little Round Island, provides gasoline, water, ice, electricity, some marine supplies, and a launching ramp. A 12-ton fixed lift can handle 36-foot (11-meter) craft for hull and engine repairs. In 1977, the reported controlling depths were 4 feet (1.2 meters) in the approach and 5 feet (1.5 meters) alongside the berths.

(204) **Clayton, N.Y.,** is on the SE side of the St. Lawrence River about 20 statute miles (17.4 nm) below Lake Ontario. **Grindstone Island** is in midriver NW of Clayton, and Washington Island is close to shore NE of the village.

(205) A causeway connects Washington Island to Clayton. The fixed span near the island end of the causeway has two 33-foot (10.1-meter) openings, each with a clearance of 6 feet (1.8 meters).

(206) Clayton is a **customs port of entry.**

(207) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

**Clayton, NY**

(208) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(209) **Small-craft facilities.**–The deep water of the river extends to within a short distance of the wharves at Clayton, at which there are depths up to 24 feet (7.3 meters). The city dock reported depths of 4 to 20 feet (1.2 to 6.1 meters) alongside in 1977. The dock has a 2 hour mooring limit. The municipal dock, marked at the outer end by a private light, is at the foot of Mary Street. In 1977, depths of 4 to 20 feet were reported alongside. Submerged ruins are on the S side at the inner end of the dock. Water and electricity are available.

(210) Several marinas at Clayton and on Calumet Island provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Lifts to 30 tons and a 50-ton marine railway that can handle 65-foot (19.8-meter) craft are available for hull, engine, and electronic repairs. Mast-stepping service is available at Calumet Island.

(211) **Charts 14766, 14767, 14774.**–Above Clayton and Calumet Island, the vessel course passes SE of **Calumet Shoal,** marked by a light, and thence N of **Bartlett Point.** A light is close off the point. A 16-foot spot is marked by a buoy about 0.5 statute mile (0.4 nm) WNW of Bartlett Point.

(212) **Charts 14802, 14767, 14774.**–About 3 statute miles (2.6 nm) above Bartlett Point, the International boundary passes between the W end of Grindstone Island and the E end of Wolfe Island and thence follows close to the S shore of Wolfe Island into Lake Ontario.

(213) Between the upper end of Grindstone Island and **Hickory Island,** an unmarked channel of natural deep water leads from the main vessel route N to connect with Canadian Middle Channel. The channel is bordered closely by islands, rocks, and shoals.

(214) The following is extracted from **Canadian Sailing Directions CEN301, St. Lawrence River, chapter 3.**

(215) **Wolfe Island Cut,** *close off the E end of Wolfe Island, is a dredged channel connecting the Seaway channel and the open water between Wolfe and Howe Islands. This channel, 140 meters (459 feet) wide, has a depth of 6.1 m (20 feet) in its SE entrance; the channel is marked by buoys and light buoys.*

(216) *Wolfe Island Light (378), on Quebec Head (44°14′N., 76°11′W.), which is the NE end of Wolfe Island, is shown at an elevation of 11.3 m (37 feet) from a white tower, 6.4 m (21 feet) high.*

(217) **Charts 14802, 14767, 14768.–Wolfe Island** is a large irregularly shaped island that extends from the broad entrance of the St. Lawrence River at Lake Ontario downriver for about 18 statute miles (15.6 nm). The island is about 6 statute miles (5.2 nm) wide at the head of the river; downstream it diminishes in width and is indented by numerous bays.

(218) **Charts 14802, 14767.**–From Bartlett Point, the vessel course continues SW for about 6 statute miles (5.2 nm), passing SE of the lower end of Wolfe Island and NW of the light that marks **Linda Island.** A shoal with a least depth of 11 feet (3.4 meters) is marked at the N end by a lighted buoy 0.9 statute mile (0.8 nm) W of Linda Island. Near this shoal the course turns W, parallel to the Wolfe Island shore, and is marked at the W end by a directional light on **Bayfield Island** with a **261°30′–264°30′** white sector.

(219) A marina on the E side of **Millen Bay,** 2.8 statue miles (2.4 nm) SW of Linda Island, provides transient berths, gasoline, water, electricity, some marine supplies, a launching ramp, and minor repairs. In 1977, the reported controlling depths were 5 feet (1.5 meters) in the approach and 2 to 10 feet (0.6 to 3 meters) at the berths.

(220) **Charts 14802, 14767, 14768.**–The vessel course turns S between **Carleton Island** on the E and **Carpenter Point** on the W and is marked at the lower end by a **013°20′** lighted range on **Irvine Point. Hinckley Flats Shoal,** on the W side of this reach, is marked on the E side by two lighted buoys. **Feather Bed Shoal,** on the E side of the channel, is marked by a lighted buoy.

(221) **Cape Vincent, N.Y.,** is a village and small-craft harbor on the S side of the St. Lawrence River about 3 statue miles (2.6 nm) below Lake Ontario.

(222) **Channels.**–A dredged channel leads along the city front on the St. Lawrence River. The channel is protected by a 1,380-foot-long (420-meter) breakwater which parallels the shore. The ends of the breakwater are marked by lights. The Federal project depth is 16 feet (4.9 meters) in the W part of the channel and 20 feet (6.1 meters) in the E part.

(223) Cape Vincent is a **customs port of entry.**

(224) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(225) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(226) **Harbor regulations.**–(See **33 CFR 207.610,** chapter 2, for harbor regulations.)

(227) **Small-craft facilities.**–Deep water can be carried to the docks in the harbor, and vessels up to 10-foot (3-meter) draft can be accommodated. Marinas in the harbor provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, some marine supplies, and a launching ramp. Mobile lifts to 16 tons are available for hull, engine, and electronic repairs.

(228) **Ferry.**–Automobile and passenger ferries operate seasonally from Cape Vincent to Point Alexandria on Wolfe Island.

(229) **Charts 14802, 14768.–Point Alexandria** (44°08.2′N., 76°21.3′W.) is at the outer end of **Hornes Point,** a jutting peninsula at the SE end of Wolfe Island opposite Cape Vincent. A ferry pier is at Point Alexandria.

(230) **Calling-in points.**–Upbound and downbound vessels shall contact "Seaway Clayton" on VHF-FM channel 13 when approximately abeam of Point Alexandria. After initial contact, vessels shall guard VHF-FM channels 16 (upbound) and 13 (downbound). (See the Seaway Handbook for details.)

(231) A light marks the Wolfe Island shore about 1.8 statute miles (1.6 nm) WSW of Point Alexandria. A lighted buoy 0.6 statute mile (0.5 nm) SE of the light marks the outer edge of an 18-foot shoal. **Bear Point** (44°05.7′N., 76°26.6′W.), at the head of the St. Lawrence River, is the southernmost point of Wolfe Island. A buoy 0.6 statute mile (0.5 nm) SSW of the point marks the outer edge of a shoal with depths of 8 feet. **Big Sandy Bay** and **Reeds Bay,** on the SW side of Wolfe Island, are separated by **Long Point.** A shoal extends 1.3 statute miles (1.1 nm) WSW from Long Point and is marked near the outer end by a buoy. **Horseshoe Island** is off **Staley Point** at the NW end of Wolfe Island.

(232) Above Cape Vincent, the vessel course extends SW for about 4 statute miles (3.5 nm) to the waters of Lake Ontario. **Tibbetts Point Light** (44°06.0′N., 76°22.2′W.), 69 feet above the water, is shown from a white conical tower on the New York shore at the head of the St. Lawrence River. **Tibbetts Point Traffic Lighted Buoy** is about 1.8 statute miles (1.6 nm) W of the light.

# 5. LAKE ONTARIO

(1) **Chart Datum, Lake Ontario.**–Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Ontario is an elevation 243.3 feet (74.2 meters) above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

**Dimensions, etc.**

(2) Length, steamer track, Burlington Bay Light to head of St. Lawrence River (Tibbetts Point); 180 miles.

(3) Length, steamer track, Port Dalhousie to head of St. Lawrence River (Tibbetts Point); 160 miles.

(4) Length (right line), W end of Burlington Bay to Sackets Harbor; 193 miles.

(5) Breadth (right line), about longitude 77°35′W.; 53 miles.

(6) Depth, maximum recorded by NOS; 802 feet.

(7) Water surface of lake (including Niagara River and St. Lawrence River above Iroquois Dam); 3,560 square miles (U.S.), 3,990 square miles (Canada).

(8) Entire drainage basin (including Niagara River and St. Lawrence River above Iroquois Dam); 18,760 square miles (U.S.), 16,090 square miles (Canada).

(9) **General description.–Lake Ontario** is the smallest and easternmost of the Great Lakes. The lake is comparatively deep; the greatest depth is 802 feet, and the average depth is 283 feet, much in excess of the greatest depth of Lake Erie. Lake Ontario is fed chiefly by the waters of Lake Erie by way of the Niagara River. The lake drains at its NE end into the St. Lawrence River. Welland Canal bypasses the falls and rapids of the Niagara River and provides a navigable connection between Lake Ontario and the upper lakes.

(10) The great depth of the lake limits fluctuations of water level caused by winds and renders them comparatively small. The lake is generally free of outlying shoals and obstructions. The only significant shoals dangerous to navigation are those in the NE end of the lake in the approach to the St. Lawrence River and those of Niagara Bar off the mouth of the Niagara River. The latter shoal is in the course of vessels plying between the Welland Canal and ports at the E end of the lake.

(11) The waters of Lake Ontario and the Welland Canal are part of the St. Lawrence Seaway and are under the navigational control of the Saint Lawrence Seaway Development Corporation, a corporate agency of the United States, and the Saint Lawrence Seaway Management Corporation of Canada. These agencies issue joint regulations covering vessels and persons using the Seaway. The regulations are codified in 33 CFR 401, and are also contained in the Seaway Handbook, published jointly by the agencies. A copy of the regulations is required to be kept on board every vessel transiting the Seaway. A schedule of the Seaway tolls is contained in the handbook. (See St. Lawrence Seaway, chapter 3, and **33 CFR 401,** chapter 2.)

(12) Vessels bound for Lake Ontario from the St. Lawrence River below Montreal are limited by the size of the locks in the river, and vessels bound from Lake Ontario to the upper lakes are limited by the size of the locks in the Welland Canal. The maximum authorized dimensions for vessels navigating the St. Lawrence Seaway locks are 730 feet overall length, 76 feet extreme breadth, and 26 feet draft. (For complete information on vessel dimension restrictions, refer to the Seaway Handbook, and for supplemental information, to the Seaway Notices.)

(13) **Vessel traffic control.**–Lake Ontario and the Welland Canal are divided into three traffic control sectors, with vessel movements in each sector controlled by a traffic controller. The objective of the system is to provide safe and efficient scheduling of vessel traffic, efficient search and rescue coverage, information regarding pilot requirements to the pilot dispatch centers, marine weather broadcasts, and information on vessel location to all interested parties.

(14) The traffic control sectors are as follows: Sector 4, from Crossover Island in the St. Lawrence River to midlake in Lake Ontario; Sector 5, the W half of Lake Ontario; Sector 6, Welland Canal and its approaches.

(15) Massena traffic control center controls traffic in the Lake Ontario portion of Sector 4 through "Seaway Sodus," VHF-FM channel 13. St. Catharines traffic control center controls traffic in Sector 5 through "Seaway Newcastle," VHF-FM channel 11, and in Sector 6 through "Seaway Welland," VHF-FM channel 14.

(16) **Calling-in points.**–Calling-in points on Lake Ontario follow:

(17) **Calling-in point Sodus Point.**–Upbound and downbound vessels shall contact "Seaway Sodus" on VHF-FM channel 13 when approximately abeam of Point Petre, Ont. After initial contact, vessels shall guard VHF-FM channel 16.

(18) **Calling-in point Mid-Lake Ontario.**–Upbound vessels shall contact "Seaway Newcastle" on VHF-FM channel 11 and downbound vessels shall contact "Seaway Sodus" on VHF-FM channel 13 upon arrival at a point in mid-lake in about 43°41′N., 77°47′W. After initial contact, vessels shall guard VHF-FM channel 16.

(19) **Calling-in points Newcastle.**–Upbound and downbound vessels shall contact "Seaway Newcastle" upon arrival at a point about 16 miles S of Newcastle, Ont., and when about 8 miles N of Thirtymile Point, N.Y. on VHF-FM channel 11. After initial contact, vessels shall guard VHF-FM channel 16.

(20) Complete information on the traffic control sectors and their respective calling-in points is contained in the Seaway Handbook.

(21) **Fluctuations of water level.**–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, the lowest stages prevailing during the winter and the highest during the summer. In addition to the normal seasonal fluctuations, oscillations of irregular amount and duration are also produced by storms. Winds and barometric pressure changes that accompany squalls can produce fluctuations that last from a few minutes to a few hours. At other times, strong winds of sustained speed and direction can produce fluctuations that last a few hours or a day. These winds drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This effect is more pronounced in bays and at the extremities of the lake, where the impelled water is concentrated in a

small space by converging shores, especially if coupled with a gradually sloping inshore bottom which even further reduces the flow of the lower return currents.

(22) Lake Ontario has less of a seiche problem than some of the other lakes. These irregular oscillations of the water surface are less pronounced in range because of the lake's smaller area and deep water along with a general symmetrical shape. There is also a lesser number of high- and low-pressure centers that pass directly over the lake.

(23) **Weather, Lake Ontario.**–Navigation-season winds are strongest in autumn. Gales are most likely from October through December and blow out of the SW through NW. This is particularly true at the E end of the lake, where a funneling effect may occur with W and SW winds, which prevail throughout most of the year. As these winds encounter land, on either side of the lake, near the Thousand Islands, they are accelerated. A moderate blow in midlake often becomes a dangerous gale in this restricted area. Another local problem area is Mexico Bay, N of Oswego. This was once known as "the graveyard of Lake Ontario" because ships foundered there in NW through NE winds. In spring, northeasterlies and easterlies occasionally reach gale force throughout the lake. May through August is often the most troublefree time; windspeeds of 16 knots or less are encountered 80 percent or more of the time. The strongest sustained measured wind on the lake was west-north-westerly at 50 knots. This short period record (17 years) occurred in November. Since extremes along the shore range from 50 to 65 knots, it could be expected that an extreme on the lake could reach 90 knots. The prevailing SW and W winds are most persistent in winter and summer. Winds with northerly components are also common in winter as are those with southerly components in summer. Autumn and spring winds are more variable.

(24) While visibilities are restricted by rain, snow, haze, and smoke, fog is the most frequent and troublesome cause. On Lake Ontario, prolonged periods of rain and foggy weather are common when frontal systems moving into New York become stationary. In the spring, advection fog reduces visibilities to below 0.5 statute mile (0.4 nm) up to 10 percent of the time. It is usually worst during the morning hours. Along the shore, radiation fog is common in autumn under calm, clear nighttime skies. This fog sometimes drifts out over the water; it usually burns off by noon. Visibilities of 2.5 statute miles (2.2 nm) or less occur on about 10 to 13 days per month from October through March along the shore.

(25) While rough seas can be encountered in any season, they are most often a problem during fall and winter. From October through February, wave heights of 5 feet (1.5 m) or more can be expected 10 to near 20 percent of the time and 10 feet (3 m) or more up to 2 percent of the time. Extreme wave heights of 17 to 19 feet (5 to 6 m) have been encountered. Since strong winds over a long fetch of water are conducive to creating rough seas, strong winds out of the E and W quadrants over Lake Ontario are often danger signals. Sea conditions are best from May through July when waves of less than 1 foot (0.3 m) occur 50 percent or more of the time.

(26) Thunderstorms can occur at any time, but are mostly a summertime problem. Along the shore, they are recorded on 20 to 30 days annually; about 75 percent or more brew up from May through September. They are most likely during the late afternoon. Over the open lake, thunderstorms are most likely during August when they occur about 2 percent of the time. Summertime thunderstorms are mostly nocturnal creatures over the lake; they are most frequent between sunset and sunrise.

(27) **Ice.**–The main part of Lake Ontario usually remains open throughout the winter, with only a few patches of thin ice and slush during cold spells. Its small area and great depth give Lake Ontario a large heat storage capacity. In addition, the land portion of the basin contributes more runoff to its lake than any of the other lakes. These factors retard the growth of ice in fall and aid its rapid decay in spring. During a normal winter, early ice cover appears toward the end of January and early decay begins in mid-March. During severe winters, extensive slush develops for brief periods, but the significant ice is confined to the E end of the lake. E of Prince Edward Point, ice formation begins in early January. The area from Kingston to Prince Edward Point and Oswego is usually covered 70 to 90 percent with thin and medium lake ice by the end of the month. This thickness increases during February and reaches the thick category by early March, but the extent is unchanged except for drifting patches of slush along the Canadian shore. By this time, fast ice about 20 to 25 inches thick usually extends in a N arc from Prince Edward Point to Stony Point. Decay generally develops in early March, and by the third week most of the pack has melted in place rather than drifting down the river. (See Winter Navigation, chapter 3.)

(28) **Local magnetic disturbances.**–Differences from normal variation of from about 006°W to 007°E have been observed at numerous locations throughout Lake Ontario. Differences of up to 37° have been observed in the approach to Kingston, Ont., on the N side of the head of the St. Lawrence River. The locations of these anomalies are shown on NOS chart 14500.

(29) **Routes.**–The Lake Carriers' Association and the Canadian Shipowners Association have recommended, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Ontario.

(30) Downbound vessels from Port Weller to Cape Vincent from a position 0.5 mile off Port Weller breakwaters, shall lay a course of **048°** for 8.5 miles to pass not more than 1.5 miles off Niagara Bar Lighted Buoy 2; thence **074°** for 103 miles to a position not less than 7 miles off Point Petre; thence **069°** for 27 miles to a position 3.5 miles to East Charity Shoal Traffic Lighted Buoy.

(31) Downbound vessels from Toronto, Port Credit, or Clarkson from a position not less than 2.5 miles off Gibraltar Point shall lay a course **085°** 113.75 miles to a position not less than 7 miles off Point Petre; thence recommended downbound courses of **069°** and **039°** to East Charity Shoal Traffic Lighted Buoy.

(32) Downbound vessels from Port Weller to Toronto, from a position 0.5 mile off Port Weller breakwaters, shall lay a course of **314°** for 4 miles; thence **349°** for 20 miles to a position not less than 3.8 miles off Toronto Main Harbour Channel range front light.

(33) Downbound vessels from Port Weller to Hamilton, from a position 0.5 mile off Port Weller breakwaters, shall lay a course **314°** for 4 miles; thence **273°** for 25 miles to Burlington Canal Entrance Lighted Bell Buoy MH.

(34) Upbound vessels from Cape Vincent to Port Weller, from East Charity Shoal Traffic Lighted Buoy, shall lay a course **240°** for 14.5 miles to a position 0.5 mile off Psyche Shoal Lighted Bell Buoy 12; thence **249°** for 22.5 miles to a position not more than 3 miles off Point Petre; thence **254°** for 102 miles to a position not less than 5.5 miles off Niagara Bar Lighted Buoy 2; thence **212°** for 11.25 miles to a position 0.5 mile off Port Weller breakwaters.

(35) Upbound vessels from Cape Vincent to Toronto, Port Credit, and Clarkson, from a position not more than 3 miles off Point Petre, shall lay a course of **263°** for 113.25 miles to a position more than 2.8 miles off Toronto Main Harbour Channel range front light; thence to destination.

(36) Upbound vessels from Toronto to Port Weller, from a position not less than 3.8 miles off Toronto Main Harbour Channel Range Front Light, shall lay a course **163°** for 23.5 miles to a position 0.5 mile off Port Weller breakwaters.

(37) Upbound vessels from Hamilton to Port Weller, from a position 0.5 mile off Burlington piers, shall lay a course 098° for 28.7 miles to a position 0.5 mile off Port Weller breakwaters.

(38) It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on chart 14800, Lake Ontario.

(39) **Caution.**–A special use airspace is in midlake in U.S. waters bounded by the following coordinates:

(40) 43°37′N., 76°45′W.;

(41) 43°24′N., 76°45′W.;

(42) 43°24′N., 78°00′W.; and

(43) 43°37′N., 78°00′W.

(44) The area may be used for military purposes from the surface to an altitude of 50,000 feet. The using agency is the Commander, 21st Air Div., Hancock Field, Syracuse, N.Y. Consult Local Notice to Marines for additional information and firing schedules.

(45) **Pilotage.**–The waters of Lake Ontario are Great Lakes undesignated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great lakes undesignated waters. The Welland Canal and its approaches are Great Lakes designated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for Lake Ontario and Welland Canal are supplied by the Great Lakes Pilotage Authority, Ltd., St. Catharines. (See appendix for address.) Pilot exchange points are off Cape Vincent, N.Y., 1 to 2 miles N of Port Weller, and at the S end of Welland Canal 1 to 2 miles S of Port Colborne. (See Pilotage, chapter 3, and **46 CFR 401,** chapter 2.)

(46) **Principal ports.**–The principal ports on Lake Ontario are at Oswego and Rochester, N.Y., and at Hamilton and Toronto, Ont. These harbors have been improved by dredging by the United States and Canadian governments, respectively, and provide access for vessels up to 26-foot draft. At Cape Vincent, N.Y., a harbor protected by a breakwater provides refuge for vessels who find that storm conditions render it unsafe to venture into the open lake from the head of St. Lawrence River. The largest drydock on Lake Ontario is at Port Weller in the Welland Canal.

(47) **Chart 14802.**–The shoreline SE for about 11 miles from Tibbetts Point to Point Peninsula is irregular, with numerous bays and outlying islands and shoals.

(48) **Tibbetts Point,** 3 miles SW of Cape Vincent, N.Y., is on the S side of the main ship channel leading from the St. Lawrence River to Lake Ontario. **Tibbetts Point Light** (44°06.0′N., 76°22.2′W.), 69 feet above the water, is shown from a white conical tower on the point; a radiobeacon is at the light. Reefs extend off about 1,000 feet around the point, and a rock ledge, with a least depth of 18 feet near its outer end, extends about 1 mile SW from the point. A lighted buoy marks the SW end of the ledge.

(49) **Wilson Point** is about 1 mile SE of Tibbetts Point and is separated from it by **Fuller Bay,** which extends inshore about 0.5 mile. A rocky spit, with 11 feet near its outer end and shoaler water inside, extends about 0.6 mile SW from Wilson Point. **Wilson Bay,** a rectangular indentation about 1 mile long and 0.5 mile wide, opens between Wilson Point on the N and **Dablon Point** on the S. The bay has depths of 10 to 20 feet, but the deep water at the entrance narrows between the spit extending from Wilson Point and a shallow bank extending 0.9 mile W from Dablon Point. This bank has a depth of 11 feet at the outer end and a 4-foot spot 0.65 mile W of Dablon Point.

(50) **Mud Bay,** a narrow, shallow inlet about 1.4 miles long, is E of Dablon Point with **Baird Point** on its S side.

(51) **Grenadier Island,** 2.3 miles long and 1.4 miles in maximum width, is 0.8 mile SW of Baird Point. **Fox Island,** E of Grenadier Island, is irregularly shaped, about 0.8 mile across at its S end and quite narrow at its N end. Between Fox Island and Grenadier Island is a shallow passage about 0.6 mile wide, with depths of 6 to 8 feet. An expanse of shallow water with mud bottom separates both islands from the shore. The shallow water extends off the SW side of the islands as much as 1.2 miles and extends SE to Point Peninsula.

(52) **Allan Otty Shoal,** about 4.7 miles SW of Tibbetts Point Light, is a narrow ridge about 0.5 mile long E and W, with rocks covered 10 feet along the N edge. A lighted buoy marks the SE side of the shoal.

(53) **Charity Shoal, East Charity Shoal,** and **South Charity Shoal,** 5 to 6 miles W of Grenadier Island, form a group of outlying rock obstructions in the approach to the S channel of the St. Lawrence River.

(54) Charity Shoal, the northernmost, is a narrow rocky ledge about 0.7 mile long and 0.25 mile wide, with a least depth of 2 feet near its center. A buoy marks the W side of the shoal.

(55) East Charity Shoal, SE of Charity Shoal, has a least depth of 10 feet and is marked by a light. The passage between Charity and East Charity Shoals is rendered unsafe by South Charity Shoal, a narrow ridge about 0.9 mile SW of East Charity Shoal Light, having a least depth of 11 feet. The SW extremity of South Charity Shoal is marked by a lighted buoy. About 3.7 miles SSW of South Charity Shoal, a detached 27-foot shoal is marked by a lighted buoy. An unmarked shoal with a least depth of 25 feet is about 5.5 miles SW of South Charity Shoal.

(56) **East Charity Shoal Traffic Lighted Buoy** is about 1.5 miles SE of East Charity Shoal Light. Vessels bound from and to the S channel of the St. Lawrence River should pass close on this buoy and well to the E and S of East Charity Shoal Light.

(57) **Charts 14802, 14811.–Point Peninsula** (44°00′N., 76°15′W.), an almost detached body of land about 6 miles long and 3 miles wide, is joined to the mainland on its NW side by a narrow neck. Shoaling extends as much as 1.2 miles off the W side and around the S end. A lighted buoy 1 mile S of the SW end of the peninsula marks the S side of the shoaling. Between the SE side of the peninsula and **Pillar Point** on the mainland opposite, a deep channel extends NE to Chaumont and Guffin Bays. The channel has general depths greater than 30 feet except for a shoal with depths of 22 to 28 feet which generally parallels the SE end of the peninsula.

(58) Between Point Peninsula and Stony Point, 8 miles S, a group of large deep bays, including Chaumont Bay, Guffin Bay, Black River Bay, and Henderson Bay, open to the N and E.

(59) **Chaumont Bay,** about 20 miles by deep water from Tibbetts Point, is separated from Lake Ontario by Point Peninsula and the adjoining mainland point. It is a large and well-protected area with depths of 18 to 30 feet of water to within 0.4 mile of shore, except for shoals in the SW end and shoals extending about 1.5 miles SE from Three Mile Point on the N side of the bay. The bay provides good anchorage, mud bottom.

(60) **Three Mile Bay, N.Y.,** is a village at the N end of **Three Mile Bay,** a small bay on the N side of Chaumont Bay. In 1977, the reported controlling depth through the bay to the village was 3 feet, thence 2 feet to and in the marina. Gasoline, ice, marine supplies, a launching ramp, and limited repairs are available.

(61) At the NE end of Chaumont Bay, **Independence Point** extends from the mainland to form two arms, the NE end of Chaumont Bay on the NW side of the point and **Sawmill Bay** on the SE side. **Johnson Shoal,** with a least depth of 2 feet, extends SW for about 1.4 miles from Independence Point and is marked on the SE side by a lighted buoy.

(62) **Chaumont, N.Y.,** a village at the NE end of Chaumont Bay, can be approached on the NW side of Independence Point or through Sawmill Bay on the SE side of the point. The Sawmill Bay approach is marked by a light on the SE side of Independence Point, and deep water in the harbor is marked by buoys and a daybeacon.

(63) The **Chaumont River** flows through the village and into Chaumont Bay on the NW side of Independence Point. A fixed highway bridge at the mouth of the river has a clearance of 20 feet, and an overhead telephone cable on the N side of the bridge has a clearance of 22 feet. The pier remains of a railroad bridge 0.1 mile NE provide a horizontal clearance of 50 feet. An overhead cable of unknown clearance crosses the river at the pier remains.

(64) **Small-craft facilities.**–Several marinas provide limited transient berths, gasoline, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, a 25-ton marine railway, mobile lifts to 25 tons, a mast-stepping crane, and hull and engine repairs. In 1977, the reported controlling depths were 5 to 10 feet to the Sawmill Bay facilities with 5 to 8 feet alongside, and 5 feet to the facilities above the highway bridge crossing Chaumont River.

(65) Chaumont has several stone quarries.

(66) **Guffin Bay** is E of Chaumont Bay and is separated from it by **Point Salubrious** and Cherry Island. The bay has good water except for about 0.5 mile of its head, where **Guffin Creek** enters. The deep portion affords good anchorage in 22 to 36 feet with mud bottom.

(67) **Cherry Island,** on the W side of Guffin Bay, is marked by a light on the SW end. The passage between the NE end of Cherry Island and Point Salubrious is about 0.5 mile wide with depths of 15 to 19 feet except for a detached 11-foot shoal about 650 feet off Point Salubrious.

(68) **Black River Bay,** opening about 6 miles E of the SW end of Point Peninsula, is entered between **Everleigh Point** on the N side and **Horse Island** on the S side. The bay is about 1 mile wide and extends NE for about 5.5 miles. The water is deep through the bay and close to the shores except for a very shallow expanse filling the upper 1.5 miles. **Black River** enters at the head of the bay. A depth of about 5 feet can be carried through the shallows and between the submerged ruins of breakwaters at the mouth of the river upstream to the village of Dexter, about 1 mile above the mouth. The channel is marked by private lighted and unlighted buoys that are shifted to mark the best water.

(69) **Sackets Harbor, N.Y.,** is on the SE side of Black River Bay, about 22 miles by water from Tibbetts Point. The harbor, about 7 acres in extent, is protected on the N side by **Navy Point.** Lights on the N side of Horse Island and on Navy Point mark the approach to the harbor. In 1976, the controlling depth in the entrance E of Navy Point was 9 feet. In 1977, the harbor basin had a reported controlling depth of 9 feet except for shoaling to 2 feet in the W end. Good anchorage is available with sand, mud, gravel, and rock bottom, taking care to avoid anchoring over the submarine cable in the SE part of the basin. Private mooring buoys extend 082° from Navy Point for approximately 80 yards.

(70) A seasonal **Coast Guard station** is on the S side of the basin.

(71) Augsbury Oil Corp. Sackets Harbor Terminal, on the S side of Black River Bay between Sackets Harbor and Horse Island, has an offshore mooring crib with 400 feet of berthing space and a deck height of about 8 feet. In 1977, depths of 22 feet were reported alongside. The terminal receives petroleum products.

(72) Several marinas at Sackets Harbor provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, mobile lifts to 8 tons, and hull and minor engine repairs. In 1977, depths of 3 to 15 feet were reported alongside the facilities.

(73) **Henderson Bay,** SW of Black River Bay on the E side of Stony Point, is a broad indentation separated from Lake Ontario by a line of shoals and small islands extending from Stony Point NE to Horse Island. The bay is about 7 miles long and 2 miles wide. Once inside, the bay is clear with depths of 20 to 40 feet close to the shore except at the E end. Shoals extend 0.7 mile SW from Horse Island and continue S to **Campbell Point** where a shoal with a least depth of 2 feet extends about 1 mile W. The bay provides good anchorage, mainly sand and mud bottom.

(74) **Bass Island,** 1.5 miles SW of Horse Island, and **Gull Island,** 0.9 mile SSW of Bass Island, are on a very small bank that extends 0.2 mile NE from Bass Island and 0.5 mile SW from Gull Island. The deep channel between the shoals off Horse and Bass Islands, about 0.7 mile wide, is the NE entrance to Henderson Bay.

(75) A partly submerged projection of land extends about 2 miles NE from Stony Point and terminates in **Six Town Point. Lime Barrel Shoal,** with a least depth of 1 foot, is the NE end of shallow water that extends 1.2 miles NE from Six Town Point. A lighted buoy on the W side of the shoal marks a small-craft passage with depths of 11 to 14 feet between Lime Barrel Shoal and Six Town Point. A deepwater passage between Lime Barrel Shoal and Gull Island has depths of 23 to 33 feet.

(76) **Henderson Harbor** is a small summer resort on the NE side of **Henderson Harbor,** a small inlet at the S end of Henderson Bay. In May 1977, the reported controlling depth to marinas in the S end of the harbor was 4 feet with 2 to 10 feet reported alongside the berths. The marinas provide transient berths, gasoline, diesel fuel, water, electricity, ice, sewage pump-out, marine supplies, launching ramps, mobile lifts to 15 tons, a 45-foot marine railway, and hull, engine, and electronic repairs.

(77) **Special anchorages** are in Henderson Harbor. (See **33 CFR 110.1 and 110.87,** chapter 2, for limits and regulations.)

(78) **Whites Bay,** with good depths, and **Snow Shoe Bay,** small and shallow, are indentations in the W shore of Henderson Bay NW of Henderson Harbor. A privately maintained channel connecting Snow Shoe Bay with Lake Ontario has depths of about 3 feet through a cut in the narrow peninsula on the NE side of Stony Point. A bridge across the channel has a 30-foot fixed span with a clearance of 12 feet.

(79) **Chart 14802.–Stony Point** (43°52.8′N., 76°15.6′W.) is a bold headland extending W from Henderson Bay with deep water close-to. **Stony Point Light** (43°50.3′N., 76°17.9′W.), 30 feet above the water, is shown from a white skeleton tower with a triangular red daymark on the W end of the point.

(80) **Stony Island** is about 2.2 miles NW of Stony Point. The channel between the mainland and the island is broad and deep and is occasionally used by tows bound to and from the St.

Lawrence River. A rocky ledge with least depths of 2 feet extends about 2.3 miles SW from Stony Island. **Calf Island** is on the W part of the ledge, and the SW end of the ledge is marked by a buoy. A detached rock ledge with a least depth of 13 feet is about 1 mile S of the buoy. A shoal with a least depth of 14 feet extends 0.4 mile off the NE end of Stony Island and is marked on the E side by a lighted buoy. **Dutch John Bay** is a small bight of deep water on the W side of Stony Island. From the head of the bay, a narrow strip of water extends SW almost through the length of the island.

(81) **Little Galloo Island,** about halfway between the SW ends of Stony and Galloo Islands, is on a bank 1 mile long and 0.5 mile wide, with broad and deep channels to either side. A detached 24-foot spot is in the channel SW of the island.

(82) **Galloo Island** is 2.4 miles W of Stony Island. **Gill Harbor,** on the NE side of Galloo Island, provides shelter for small craft. The harbor is enclosed by a gravel spit across which a channel has been dredged. In 1961, the controlling depth was 7 feet in the entrance channel.

(83) **North Pond,** near the N end of the island, has a depth of 3 feet. The entrance is through a narrow channel along a crib pier at the E end of the pond. In 1976, the controlling depth was 2 feet in the entrance.

(84) Shoals extend about 0.6 mile off the NE and SW ends of the island.

(85) **Galloo Island Light** (43°53.3′N., 76°26.7′W.), 58 feet above the water, is shown from a gray conical tower at the SW end of the island.

(86) **Galloo Shoal,** about 1.3 miles W of Galloo Island Light, has a least depth of 3 feet, and is marked off its W side by a lighted buoy. Vessels bound to and from the St. Lawrence River should pass W of the buoy, although there is a deep passage about 0.8 mile wide between the shoal and Galloo Island.

(87) An unmarked snag, covered 16 feet, is 0.4 mile NE of Galloo Shoal, and an unmarked wreck is 1 mile NE of the shoal.

(88) **Charts 14802, 14803.**–From Stony Point the coast trends generally S for about 22 miles, and thence W for about 7 miles to Nine Mile Point. **Mexico Bay** is the broad, open formation in the bend E of Nine Mile Point.

(89) The shoreline, for about 4 miles SE of Stony Point, is a series of irregular indentations with a rocky bank extending as much as 0.9 mile offshore. About 4.5 miles SE of Stony Point, **Drowned Island,** covered 1 foot, is on a bank that extends 1 mile offshore and is marked by a buoy.

(90) **Chart 14803.**–The lakeshore S of Drowned Island is relatively straight for about 17 miles with deep water about 1 mile off. In this stretch, several shallow ponds, fed by numerous creeks, are practically cut off from the lake by narrow ridges of shore.

(91) **North Pond,** about 13 miles S of Stony Point, is separated from the lake by a long, narrow neck of land. The narrow, continually shifting entrance channel had a reported controlling depth of 3 feet in 1977. Local knowledge is advised. The pond, about 3.5 miles long and 2 miles wide, has depths of 6 to 13 feet with shoaling to lesser depths along the shore and on the N, E, and S sides. Several marinas on the pond provide berths, gasoline, ice, marine supplies, sewage pump-out, launching ramps, a 3-ton mobile hoist, and engine and hull repairs. In 1977, depths of 2 to 4 feet were reported alongside the berths.

(92) **Sandy Pond** is a village at the S end of the pond.

(93) The **Salmon River,** about 6 miles S of North Pond entrance, empties into **Port Ontario** which is entered through a dredged channel protected by breakwaters. The dredged channel leads about 0.5 mile to the town of **Selkirk.** The approach to the entrance channel is marked by a private light. The entrance channel is marked by lights at the ends of the breakwaters and buoys. In September 1998, the controlling depth was 7 feet in the dredged channel to just below the head of the project, thence 4 feet to the end.

(94) **Little Salmon River** enters the SE side of Mexico Bay. The town of **Texas** is 1 mile above the mouth.

(95) In Mexico Bay, from Selkirk to **Nine Mile Point** (43°31.5′N., 76°22.0′W.), the bottom is rock, and deep water is within 1 mile of the shore. The headland W of Nine Mile Point is relatively deep-to, and SW to Oswego shallow water extends no more than 1 mile offshore.

(96) The James A. FitzPatrick Nuclear Power Plant and the Niagara Mohawk Power Corp. Nine Mile Point Nuclear Station are on the headland W of Nine Mile Point.

(97) **Charts 14803, 14813, 14786.–Oswego Harbor**, at the mouth of the **Oswego River**, is on the S shore of Lake Ontario about 15 miles from its E end and about 45 miles S of Tibbetts Point at the head of the St. Lawrence River. The harbor serves the city of **Oswego, N.Y.**, and is the terminus of the Oswego Canal of the **New York State Canal System.** The harbor comprises an outer breakwater harbor of refuge and an inner terminal harbor in the Oswego River. Because most of the very severe storms are from the W and NW, with a fetch the entire length of the lake, the outer harbor is an important harbor of refuge for vessels in this part of the lake.

(98) An unmarked **dumping ground** with a least reported depth 35 feet is about 1.5 miles NNW of the entrance of Oswego Harbor.

(99) **Prominent features.**–The strobe-lighted stacks at the powerplant 1 mile W of the river mouth are prominent in the harbor approach.

(100) **Channels.**–A dredged approach channel leads E from the lake S of a detached breakwater and between converging breakwaters into the outer harbor of refuge. From the outer harbor, the inner harbor extends up the Oswego River for 0.5 mile along the Oswego piers. Another channel, protected by an extension of the W breakwater, extends SW from the outer harbor along the shore to a turning basin. The breakwaters are marked by lights, and the channels by lighted and unlighted buoys. A fog signal is at the light on the west breakwater.

(101) In September 1998, the controlling depths were 23 feet in the approach channel and in the channel through the outer harbor, thence 20 feet in the river channel to the head of the Federal project at Seneca Street.

(102) The outer harbor W of the entrance channel had depths of 14 to 20 feet except for lesser depths along the S end of the W breakwater. The outer harbor E of the entrance channel had depths of 18 to 21 feet except for shoaling to 15 feet along the SE edge; the extreme SE end of the outer harbor is not being maintained. The channel leading SW to the turning basin had a depth of about 16 feet with 15 to 21 feet in the basin; the SE section of the channel was not being maintained.

(103) In November 1983, a large anchor was reported lost in the W part of the outer harbor in about 43°28′03″N., 76°31′04″W.

(104) A dangerous 3-foot spot is off the E face of the Port of Oswego Authority Grain Wharf at the W side of the mouth of the river in about 43°27′53″N., 76°30′53″W. Caution is advised.

(105) Mooring vessels to the breakwaters, and anchoring in the outer harbor where it will interfere with navigation, are prohibited.

Oswego, NY
N

(106) The **Oswego Canal** of the New York State Canal System enters Oswego Harbor through a dredged canal on the E side of the Oswego River above the Bridge Street bridge. This bridge has a clearance of 26 feet above normal pool level, New York State Canal System datum. (For information on the Oswego Canal, see chapter 14, Hudson River, New York Canals, and Lake Champlain.)

(107) **Dangers.**–It is reported that during flood river conditions currents in the river attain velocities up to 5 mph (4.3 knots).

(108) Oswego is a **customs port of entry.**

(109) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(110) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(111) Oswego has a hospital.

(112) **Oswego Coast Guard Station** is on the S side of the outer basin 0.2 mile W of the mouth of Oswego River.

(113) **Wharves.**–Oswego has deep-draft facilities in the outer harbor and in the Oswego River. All wharves have highway connections. The alongside depths for the facilities described are reported depths; for information on the latest depths, contact the operator.

(114) **Port of Oswego Authority Grain Wharf** (43°27′56″N., 76°31′00″W.): S shore of the outer harbor 500 feet W of the river; 1,000-foot pier; 22 to 23 feet alongside the E face, 15 to 21 feet alongside the W face; deck height, 5 feet; 28,000 square feet covered storage; 1-million-bushel grain elevator; receipt of petroleum and grain; owned and operated by Port of Oswego Authority.

(115) **Port of Oswego Authority East Side Wharf** (43°27′50″N., 76°30′43″W.): E side of Oswego River just inside the mouth; 1,700-foot wharf; 25 feet alongside; deck height, 5 feet; 100,000 square feet covered storage, 36,000 square feet covered bulk cargo storage, 9.2 acres open storage; cranes to 200 tons; four bucket loaders; rail connections; water and electrical connections; receipt of aluminum ingots and potash, receipt and shipment of general cargo; owned and operated by Port of Oswego Authority.

(116) **Northeastern Cement Wharf** (43°27′41″N., 76°30′46″W.): W side of river 1,500 feet above the mouth; 340-foot marginal wharf, 500 feet usable using adjacent property; 25 feet alongside; deck height, 5 feet; pipelines extend to cement silos, 22,390-ton capacity; freshwater connections; receipt of cement; owned and operated by Northeast General Portland, Inc.

(117) **New York State Canal Oswego Terminal** (43°27′28″N., 76°30′34″W.): E side of river immediately N of the Bridge Street bridge; 594-foot face; 7 to 14 feet alongside; deck height, 8 feet; used by vessels awaiting barge canal lockage; owned by New York State Department of Transportation.

(118) **Niagara Mohawk Power Corporation Fuel Wharf** (43°27′37″N., 76°31′52″W.): at the SW end of the outer harbor; 400-foot face, 560 feet usable; 10 to 21 feet alongside; deck height, 8 feet; pipelines extend to four tanks; receipt of petroleum products; owned and operated by Niagara Mohawk Power Corporation.

(119) **Supplies.**–Some marine supplies and provisions are available at Oswego. Tank trucks deliver diesel oil to most wharves.

(120) **Small-craft facilities.**–**Wrights Landing Marina** (43°27.5′N., 76°31.1′W.) is in the outer harbor about 1,200 feet W of Port of Oswego Authority Grain Wharf. Over 40 berths, sewage pump-out, and launching ramps are available. In April 1985, depths of 8 feet were reported alongside the berths. A marina on the E side of the river 0.3 mile above the mouth provides transient berths, gasoline, diesel fuel, electricity, water, ice, sewage pump-out, marine supplies, a 12-tonhoist, and hull and engine repairs. In 1991, depths of 10 feet were reported alongside the berths. Launching ramps are also available in the W part of the outer harbor.

(121) **Communications.**–Oswego is served by rail and bus.

(122) **Chart 14803.**–From Oswego, the bold shoreline runs SW for about 7 miles to **West Ninemile Point** (43°24.8′N., 76°37.8′W.). About 3 miles NE of this point is **Ford Shoals,** a group of boulders and stony mounds just below the water surface. The shoals extend about 0.7 mile offshore and are marked on the NW side by a lighted buoy.

(123) From West Ninemile Point SW for 6 miles to Little Sodus Bay, the shore is hilly, and shallow water extends from 0.5 to 1 mile offshore. **Sabin Point,** on the E side of the entrance to Little Sodus Bay, separates the bay from **The Pond.** A channel from Lake Ontario into The Pond leads under a fixed bridge. The Pond, however, is virtually closed to navigation, because it is close to a bathing beach and the bridge.

(124) **Little Sodus Bay,** 13 miles SW of Oswego, extends 2 miles S from the shore of the lake. Its shores are bold, except in the bights.

(125) An unmarked **dumping ground** with a least reported depth of 35 feet is about 2.5 miles NNE of the bay entrance.

(126) **Channels.**–The bay is entered from Lake Ontario through a dredged channel between parallel piers. The inner end of the E pier extends laterally E to enclose the bay. In September 1998, the controlling depth was 7 feet. The outer ends of the piers are marked by lights.

(127) **Anchorages.**–The bay has good anchorage in 24 to 36 feet, clay bottom.

(128) **Dangers.**–With W winds, a strong current runs across the outer end of the entrance piers. Avoid being set E of the pierheads where the bottom is hardpan with no holding ground.

(129) In July 1981, shoaling to 5 feet was reported on the W side of the bay in the vicinity of **Grass Island** in about 43°20′18″N., 76°42′36″W. The shoal is reported to be shifting E.

(130) **Small-craft facilities.**–A pier, with reported depths to 12 feet alongside, at the NE end of the bay at Fair Haven Beach State Park provides sewage pump-out, marine supplies, and a launching ramp. Marinas in the S end of the bay provide transient berths, gasoline, water, ice, electricity, launching ramps, mobile lifts to 12 tons, a mast-stepping crane, and emergency shaft and propellor repairs. In 1977, depths of 4 to 10 feet were reported alongside the berths.

(131) **Charts 14803, 14804.**–From Little Sodus Bay, the shore trends SW for about 14 miles to Sodus Bay. The shore is hilly, and a rock bank extends a maximum of about 1 mile offshore.

(132) **Blind Sodus Bay,** just W of Little Sodus Bay, is separated from Lake Ontario by a narrow strip of land. The bay has a maximum depth of about 21 feet.

(133) **Port Bay** is about halfway between Little Sodus and Sodus Bays. A privately maintained and marked channel enters the bay from Lake Ontario and is protected on the W by a short pier and fill. In August 1993, the controlling depth in the channel was 6 feet. The entrance is extremely difficult to make in rough weather. An overhead cable with an unknown clearance crosses the entrance channel. Good water is available inside the bay. Transient berths, gasoline, water, electricity, and a launching ramp are available in the bay.

(134) **Chart 14804.–East Bay,** about 4 miles E of Sodus Bay at the mouth of **Mudge Creek,** is small and shallow and closed to lakeward.

(135) **Charts 14804, 14814.–Sodus Bay,** also known as **Great Sodus Bay,** is 27 miles SW of Oswego. The shores of the bay are bold, and the depths are from 18 to 48 feet, generally to within 0.2 to 0.4 mile of the shore. The SE arm of the bay has depths of 9 to 15 feet to within 0.1 mile of the shore.

(136) **Sand Point,** a low sandspit, extends about 0.6 mile ESE from the NW side of the bay just inside the entrance. The small bight on the N side of Sand Point has depths of 1 to 4 feet, but the water at the extremity of the point deepens rapidly to 30 feet and more.

(137) **Newark Island, Eagle Island,** and **LeRoy Island** are in the shallow NE part of the bay. The first two are deep-to on the W or bay side.

(138) **Sodus Outer Light** (43°16.6′N., 76°58.5′W.), 51 feet above the water, is shown from a square white pyramidal tower on the N end of the W entrance pier. A fog signal is at the light.

(139) An unmarked **dumping ground** with a least reported depth of 35 feet is about 2 miles NE of the entrance to Sodus Bay.

(140) **Channels.**–A dredged channel extends from deep water in Lake Ontario between parallel piers to the bay. The inner end of the E pier extends laterally eastward to **Charles Point** to enclose the bay. The outer ends of the piers are marked by lights, and the entrance channel is marked by lighted buoys and a light. In September 1998, the channel had a controlling depth of 8½ feet from deep water in the lake.

(141) **Anchorage.**–The bay is the most capacious and secure anchorage along the New York shore and reported to be congested at times. The holding ground is good with a mud bottom.

(142) **Dangers.**–Along the shoreline within Sodus Bay are numerous obstructions, including submerged cribs, dock ruins, submerged piles, and several wrecks, which hamper small-craft navigation.

(143) Sodus Point is a **customs port of entry.**

(144) **Sodus Point Coast Guard Station,** seasonal, is on the W side of the entrance channel.

(145) **Small-craft facilities.**–Marinas and boatyards at the village of **Sodus Point, N.Y.,** on the W side of Sodus Bay, provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, a mast-stepping crane, mobile lifts to 50 tons, and hull, engine, and electronic repairs. In 1977, depths of 4 to 20 feet were reported alongside the berths.

(146) **Chart 14804.**– The shoreline from Sodus Bay trends generally WNW for 10.5 miles to Pultneyville. The E part of this stretch is marked by hills; for about 3 miles W from Sodus Bay, shoals extend offshore about 0.7 mile. Elsewhere, deep water is less than 0.4 mile offshore. A marina at **Fairbanks Point,** about 2 miles E of Pultneyville, provides gasoline, water, ice, electricity, a launching ramp, and hull and engine repairs.

(147) **Pultneyville, N.Y.,** is a recreational small-craft harbor on **Salmon Creek.** The entrance to the creek is sheltered by a point of land on the W, but is exposed to the N and E.

(148) The entrance channel between two submerged jetties is marked by private lighted buoys and ranges. In 1981, the controlling depth was reported to be 5 feet in the entrance and in the cove at the mouth of the creek. A marina in the cove provides gasoline, water, electricity, sewage pump-out, launching ramps, fixed lifts to 2 tons, and emergency repairs. In 1977, depths of 1½ to 5 feet were reported at the berths.

(149) The shore from Pultneyville continues W for 6.5 miles to **Smoky Point,** thence W for about 6 miles to **Ninemile Point,** and thence SW for 5.5 miles to Irondequoit Bay. Deep water along this stretch is about 0.5 mile offshore.

(150) **Irondequoit Bay** is about midway between the mouth of the Niagara River and the head of the St. Lawrence River, and about 3.5 miles E of the Genesee River entrance. The bay is irregularly shaped with hilly shores, and extends inland about 4 miles.

(151) **Channels.**–A dredged channel extends from deep water in the lake between breakwaters into the bay, thence about 0.6 mile southerly in the bay. The breakwaters are marked by lights.

(152) In July 1998, the dredged channel controlling depths were 4 feet in the W half and 3 feet in the E half to just inside the bay; thence in March-April 1997, 4½ feet (7 feet at midchannel) to the head of the project. State route 104 fixed highway bridge with a clearance of 44 feet crosses the bay 1.6 miles S of the entrance channel.

(153) **Charts 14804, 14815.**–From Irondequoit Bay WNW for 3.8 miles to the mouth of the Genesee River, deep water is about 0.5 mile offshore. A rock covered ½ foot is close inshore about 0.7 mile SE of the Genesee River entrance.

(154) **Rochester Harbor,** at the mouth of the **Genesee River,** is 56 miles W of Oswego Harbor and about 7 miles N of the main business district of the city of **Rochester, N.Y.** The river is navigable for about 5.5 miles above the mouth. The first of a group of dams is about 7 miles upstream from Lake Ontario. There is no navigable connection between the lower portion of the Genesee River and the New York State Canal, which connects with the river about 11 miles upstream from the lake. The surface elevation of the river falls more than 260 feet between the Rochester Terminal of the New York State Canal System and the head of navigation of the lower portion of the river below the dams.

(155) An unmarked **dumping ground** with a least reported depth of 35 feet is about 1.8 miles NE of the mouth of the Genesee River.

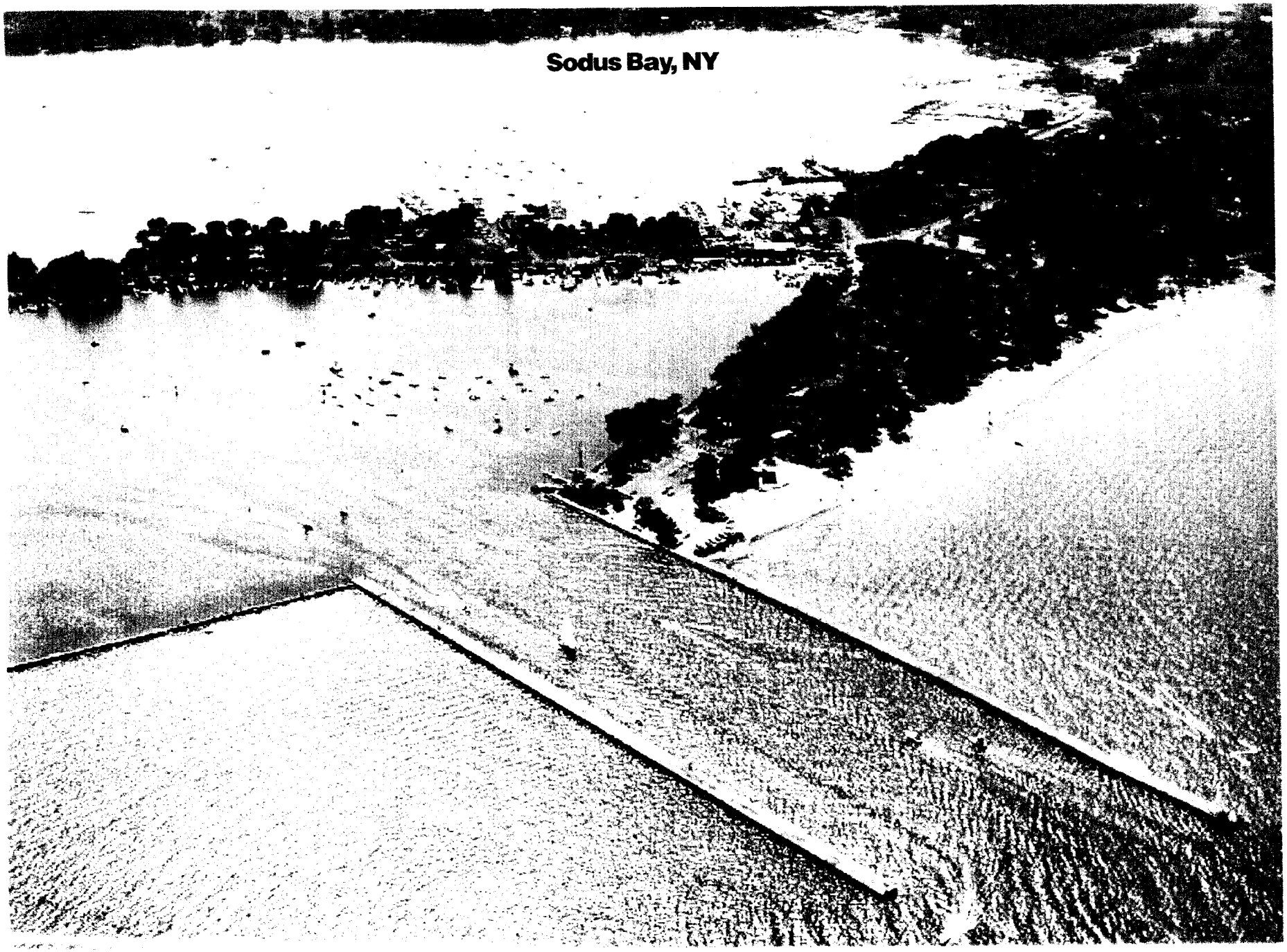
(156) **Prominent features.**–The lighted stacks at the powerplant 1.6 miles WNW of the river mouth, the stacks at the sewage treatment plant 1.9 miles SE of the river mouth, and the tall apartment building 1.1 miles SW of the river mouth are the most prominent objects from offshore.

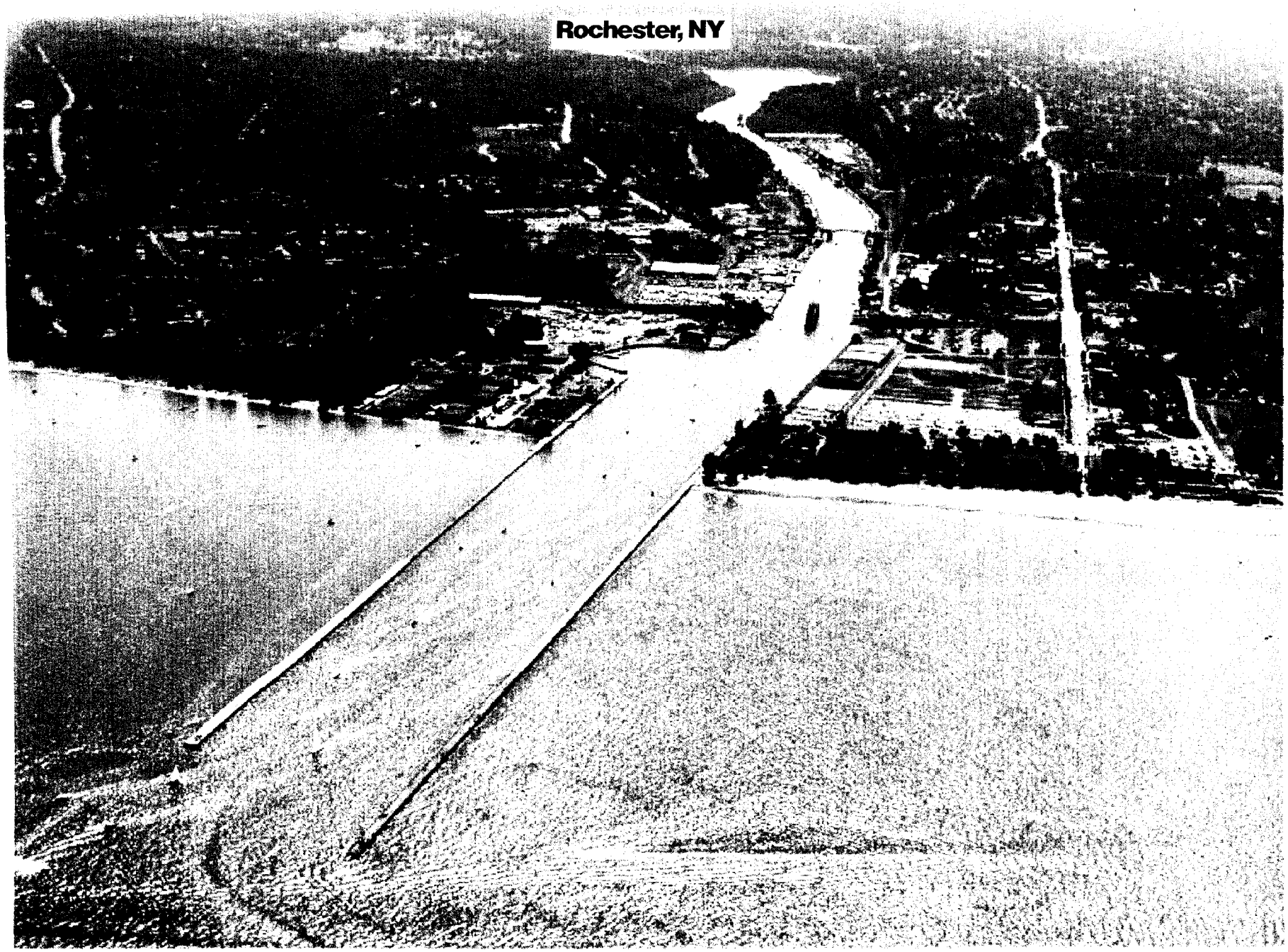
(157) **Rochester Harbor Light** (43°15.8′N., 77°36.0′W.), 59 feet above the water, is shown from a red skeleton tower with a red enclosed top on the outer end of the W pier. A fog signal is at the light.

(158) **Channels.**–The river is entered from Lake Ontario through a dredged channel that leads between two piers, thence upstream for 2.6 miles above the mouth. There are two turning basins, one just inside the mouth and the other 2 miles above the mouth on the W side of the channel. The outer ends of the entrance piers are marked by lights, and a buoy marks a shoal that extends into the N part of the upper turning basin.

(159) In March 1997, the controlling depths were 18 feet (19 feet at midchannel) to the lower turning basin with 8 to 16 feet in the basin; thence 13 feet (17 feet at midchannel) to the upper turning basin, with 12 to 18 feet in the basin; thence 10 feet to the head of the project. The W section of the upper turning basin is no longer maintained.

(160) Mooring is allowed on the lakeside of the piers only.


Sodus Bay, NY


Rochester, NY

(161) **Anchorages.**–(See **33 CFR 162.165 and 207.600,** chapter 2, for regulations.)

(162) **Dangers.**–It is reported that NE winds sometimes create waves as high as 6 feet which reflect through the entrance channel between the piers, making navigation into the harbor difficult. River currents sometimes compound this problem. A dangerous sunken wreck is 0.8 mile ENE of Rochester Harbor Light.

(163) **Bridges.**–Two bridges cross the dredged section of the Genesee River. The ConRail bridge 0.9 mile above the pierheads has a swing span with a clearance of 10 feet. The Stutson Street bridge 0.4 mile upstream has a bascule span with a clearance of 24 feet. (See **33 CFR 117.1 through 117.59 and 117.785,** chapter 2, for drawbridge regulations.) Overhead power cables crossing the river 2.8 miles above the pierheads have a clearance of 141 feet. Above the limit of the Federal project, Ridge Road bridge, 5.5 miles above the pierheads, has a fixed span with a clearance of 160 feet. The Driving Park Avenue bridge, 6.4 miles above the pierheads, has fixed span with unknown clearance.

(164) **Weather, Rochester and vicinity.**–Rochester, NY, located on the south shore of Lake Ontario and in the western part of the state, averages about ten days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 82°F (27.8°C) and an average minimum of 61°F (16.1°C). January is the coolest month with an average high of 31°F (-0.6°C) and an average minimum of 17°F (-8.3°C). The highest temperature on record for Rochester is 100°F (37.8°C) recorded in June 1953 and the lowest temperature on record is -19°F (-28.3°C) recorded in February 1979. About 135 days each year experience temperatures below 32°F (0°C) and an average 13 days each year records temperatures below 5°F (-15°C). Every month has seen temperatures below 50°F (10°C) and every month except June, July, and August has recorded temperatures below freezing (0°C).

(165) The average annual precipitation for Rochester is 31.7 inches (805 mm) which is fairly evenly distributed throughout the year. Precipitation falls on about 225 days each year. The wettest month is August with 3.2 inches (81 mm) and the driest, January and February, each average only 2.2 inches (56 mm). An average of 27 thunderstorm days occur each year with July and August being the most likely months. Snow falls on about 100 days each year and averages about 93 inches (2362 mm) each year. December, January, and February each average greater than 20 inches (508 mm) per year with a slight maximum in January. Eighteen inch (457 mm) snowfalls in a 24-hour period have occurred in each month December through March. About 20 days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June, July, and August. Fog is present on average 125 days each year and is evenly distributed throughout the year with a slight maximum in August.

(166) The prevailing wind direction in Rochester is the west-southwest, off the lake. January is the windiest month but a maximum gust of 62 knots occurred in April 1975.

(167) (See page T-1 for **Rochester climatological table.**)

(168) Rochester is a **customs port of entry.**

(169) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(170) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(171) Rochester has several hospitals.

(172) **Rochester Coast Guard Station** is on the E side of the river just inside the mouth.

(173) A **speed limit** of 6 mph is enforced in Rochester Harbor. (See **33 CFR 162.165,** chapter 2, for regulations.)

(174) **Wharves.**–Rochester has facilities on both sides of the river for about 3 miles above the mouth. The facilities described have freshwater connections. The alongside depths are reported depths; for information on the latest depths, contact the operator.

(175) **The City of Rochester Port of Rochester** (43°15′20″N., 77°36′26″W.): marginal wharf on the NW side of the river about 0.3 mile inside the entrance; 1,275-foot face; 9 feet alongside; deck height, 9 feet; 100,000 square feet covered storage; 9 acres open storage; rail connections; owned by the city of Rochester and operated by Pittston Stevedoring and Warehouse Corp. In 1977, this facility had been inactive for 3 years.

(176) **Charlotte Docks** (43°13′30″N., 77°37′00″W.): on the W side of the river about 2.9 miles above the river entrance; 137-foot T-head, 330 feet usable berthage with mooring posts; 13 feet alongside; deck height, 7 feet; 26,000-ton cement silo farm; electrical connections; owned and operated by Rochester Portland Cement Corp.

(177) **Supplies.**–Some marine supplies, water, provisions, and diesel fuel can be obtained at Rochester.

(178) **Small-craft facilities.**–Marinas at Rochester provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, mobile lifts to 40 tons, and hull, engine, and electronic repairs. In 1977, depths of 2 to 12 feet were reported alongside the berths.

(179) **Communications.**–Rochester is served by rail, air, and bus. Rochester-Monroe County Airport is about 10 miles SSW of the river entrance.

(180) **Charts 14804, 14805.**–Anchorage with good protection from W winds is available between the mouth of the Genesee River and **Braddock Point** (43°19.4′N., 77°42.9′W.), about 7 miles NW. Adequate depths are found within 1 mile offshore. Numerous potable water intakes are within 2.5 miles NW of the Genesee River and a dangerous wreck covered 1.4 feet is 0.2 mile offshore in about 43°17.6′N., 77°40.2′W.; caution is advised. **Lewis Shoal** , covered 14 feet, is centered about 1.2 miles offshore extending from about 43°18.5′N., 77°40.5′W. to 43°18.8′N., 77°39.5′W., with a width of about 600 yards. The shore is low and consists mostly of bars enclosing a series of shallow ponds or enlarged outlets of creeks.

(181) **Chart 14805.–Braddock Bay,** just SE of Braddock Point, is separated from Lake Ontario by long necks of land extending from the SE and from the NW with an entrance between. The channel through the bay is marked by private lighted buoys. In 1984, the reported controlling depth across the entrance bar was 2 feet. In June 1987, shoaling to an unknown depth was reported to exist in the channel leading into the bay. Several marinas in the bay provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, lifts to 14 tons, and hull, engine, and electronic repairs. In 1977, depths of 4 to 5 feet were reported alongside the berths.

(182) **Braddock Point Light** (43°20.5′N., 77°45.5′W.), 55 feet above the water, is shown from a brown circular tower on **Bogus Point**, 2.7 miles NW of Braddock Point.

(183) About 2 miles W of Braddock Point Light, a boulder bank extends about 0.8 mile from shore to **Wautoma Shoals,** which is marked by a lighted buoy. A dangerous wreck is close E of the lighted buoy.

(184) The shoreline W to **Devils Nose** (43°22.1′N., 77°58.6′W.), a small bold knob 11 miles W of Bogus Point, has deep water 0.5

mile off, except for 7-foot depths extending 0.5 mile off just E of Devils Nose. There are no outlying obstructions from Devils Nose to Point Breeze, 11 miles W, except for a rock ledge covered 5½ feet about 0.6 mile offshore, 1.5 miles E of Point Breeze.

(185) **Point Breeze Harbor** is at the mouth of **Oak Orchard Creek.** The village of **Point Breeze, N.Y.**, is on the E side of the harbor. The approach to the creek from Lake Ontario is through two dredged channels that lead around either end of a detached breakwater, join, and lead S between two jetties through the mouth of the creek to a harbor basin with its upper end about 0.2 mile above the mouth. Lights mark the detached breakwater and the jetties. In November 1998, the controlling depths were 3½ feet (4½ feet at midchannel) in the E approach and 5 feet in the W approach, thence 8 feet between the jetties with 6 to 12 feet in the harbor basin. There is a 1½-foot shoal spot on the E end of the detached breakwater.

(186) **Caution.**–In May 1977, it was reported that several vessels have grounded on the detached breakwater when entering at night. Local knowledge is advised.

(187) Twin fixed highway bridges with clearances of 54 feet, and a fixed highway bridge with a clearance of 8 feet, cross Oak Orchard Creek about 0.8 mile and 1.7 miles above the detached breakwater, respectively.

(188) Several marinas at Point Breeze provide transient berths, gasoline diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, mobile lifts to 25 tons, and hull, engine, and electronic repairs.

(189) From Point Breeze 15 miles W to Thirtymile Point, shallow water with a rocky bottom extends from 0.3 to 0.6 mile offshore. From about 2.5 to 3.5 miles E of Thirtymile Point, depths of 6 to 8 feet are about 0.5 mile offshore.

(190) **Charts 14806, 14805.–Thirtymile Point Light** (43°22.5′N., 78°29.2′W.), 60 feet above the water, is shown from a square tower on the NE corner of a two story house on **Thirtymile Point**. A radio mast is 50 feet SW of the light.

(191) **Charts 14806, 14810.**–From Thirtymile Point, the shoreline trends SW for about 12 miles to Olcott, thence about 6 miles to Wilson, and continues SW for about 12.3 miles to the mouth of the Niagara River. From Thirtymile Point to about 2.4 miles W of Olcott, deep water is within 0.3 mile of the shore, but from the latter point to near the mouth of Niagara River, the bank extends about 0.7 mile from shore.

(192) **Olcott, N.Y.**, is a village at the mouth of **Eighteenmile Creek.**

(193) An unmarked **dumping ground** with a least reported depth of 35 feet is 1.5 miles N of the creek entrance.

(194) The creek is entered from Lake Ontario through a dredged channel between two piers. The W pier is marked by a light. In May 1997, the controlling depth was 7½ feet in the dredged channel. Depths of about 3 to 7 feet were available to the fixed highway bridge 0.4 mile above the entrance. The channel, however, is unstable because of mud deposits from Eighteenmile Creek and drifting sand from the W. A rock ledge with a least depth of 10 feet is across the entrance channel 500 feet lakeward of the piers.

(195) An overhead telephone cable with an authorized clearance of 56 feet (55 feet reported) and a fixed highway bridge with a reported clearance of 50 feet cross the creek about 0.2 mile and about 0.4 mile above the mouth, respectively.

(196) Several marinas in the creek provide transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, a launching ramp, a 30-ton mobile lift, and hull, engine, and electronic repairs. In 1977, depths of 6 to 11 feet were reported alongside the berths.

(197) In September 1981, a submerged rock was reported about 3.3 miles W of Olcott in about 43°19′56″N., 78°47′00″W.

(198) **Charts 14810, 14806, 14822.–Wilson Harbor** is in the mouth of **East Branch Twelvemile Creek,** about 12 miles E of the mouth of the Niagara River. The widened mouth of the creek forms **Tuscarora Bay,** which is about 2 feet deep in its natural depth and provides good anchorage for shallow-draft vessels.

(199) An unmarked **dumping ground** with a least reported depth of 35 feet is 1.3 miles N of the harbor entrance.

(200) The entrance to the harbor from Lake Ontario is through a dredged channel that leads between parallel piers and thence upstream for 0.8 mile through Tuscarora Bay. The W pier is marked by a light, and daybeacons and buoys mark the channel through Tuscarora Bay. In May 1997, the controlling depths were 5½ feet in the entrance channel between the piers, and thence 4 feet to the head through Tuscarora Bay.

(201) Overhead cables with clearances of 65 and 75 feet cross the bay about 0.3 and 0.7 mile above the mouth, respectively.

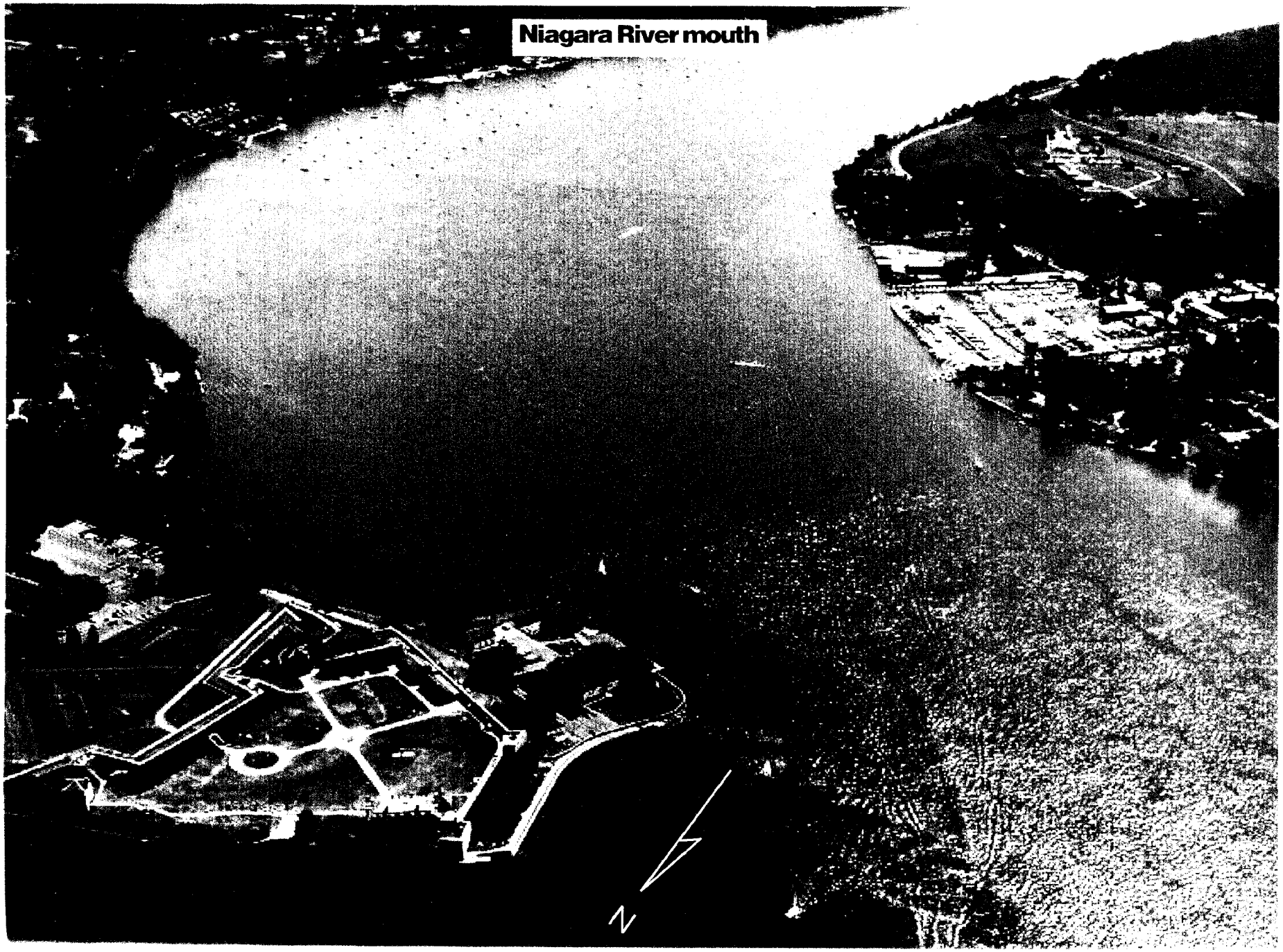
(202) Several marinas in Tuscarora Bay provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, a 25-ton mobile hoist, and hull, engine, and electronic repairs. In 1977, depths of 4½ to 10 feet were reported alongside the berths.

(203) **Charts 14806, 14810, 14822, 14816.–Niagara River Below Niagara Falls.**–The Niagara River flows from the NE end of Lake Erie and enters Lake Ontario about 36 miles from its W end. The Lake Ontario entrance to the river is between two land points occupied by **Fort Niagara, N.Y.**, on the E, and **Fort Mississauga, Ont.**, on the W. The **International boundary** between the United States and Canada generally follows a middle of the river course through the lower Niagara River.

(204) **Chart Datum** in the lower Niagara River, from Lake Ontario to the head of navigation, at Lewiston, NY, is the same as Low Water Datum of Lake Ontario, which is an elevation 243.3 feet (74.2 meters) above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

(205) The Niagara River, with its great volume of water and a current of about 2.2 knots, deposits considerable sediment in Lake Ontario and forms extensive shoals for a radius of about 3 miles off the mouth of the river. A bank with least depths of 5 feet extends about 0.8 mile off the E side of the entrance and is marked on its NW side by a lighted bell buoy. **Rumsey Shoal,** with depths of 17 feet, is an unmarked detached shoal about 1.5 miles N of Fort Niagara. **Niagara Bar** extends from shore about 2 miles W of the river mouth NE to a point about 3 miles N of the river mouth. The N part of the shoal has depths of 12 and 13 feet, but depths of 8 feet are found to about 1.5 miles offshore NW of the river mouth. Commercial sand and gravel dredging is conducted intermittently in the area and depths are subject to change. In August 1982, an obstruction covered 3 feet was reported in about 43°16′00″N., 79°05′12″W. Vessels bound between the Welland Canal and points E of the Niagara River must avoid Niagara Bar by passing N of the lighted buoy about 3.7 miles N of Fort Niagara.

(206) The entrance to the Niagara River is marked by lighted buoys, a **149°30′** lighted range, and lights at Fort Niagara and Fort


Niagara River mouth
N

Mississauga. **Fort Niagara Light** (43°15.7′N., 79°03.8′W.), 80 feet above the water, is shown from a tower with a white and green diamond-shaped daymark on the E side of the river at the mouth.

(207) At the prevailing stages during the navigation season, a depth of about 13 feet may be carried into the river by closely following the lighted range. An alternate approach is on course **187°**, avoiding the E edge of Niagara Bar and leaving the lighted bell buoy marking the bank off Fort Niagara close aboard to port, and then swinging for the river when on the lighted range.

(208) Once inside the river, an unobstructed channel with depths of 30 to 70 feet leads to Lewiston at the foot of the rapids below Niagara Falls, about 7 miles above the mouth.

(209) **Niagara Coast Guard Station** is on the E side of the Niagara River entrance. In 1977, depths of 14 feet were reported alongside the Coast Guard wharf.

(210) **Niagara-on-the-Lake, Ont.,** is on the W side of the mouth of the river. A **Canadian customs reporting station** is at Niagara-on-the-Lake. (See Canadian Customs, chapter 1.) The customs wharf has depths of 4 to 10 feet alongside.

(211) A small-craft basin immediately S of the customs wharf provides gasoline, diesel fuel, sewage pump-out, a 25-ton marine railway, a 20-ton hoist, and hull and engine repairs. Depths of 2 to 5 feet are reported in the basin. Mariners are cautioned that strong winds tend to raise or lower the water level in the basin by as much as 2 feet.

(212) **Youngstown, N.Y.,** is on the E side of the river about 1 mile above the mouth.

(213) A **special anchorage** is on the E side of the river at Youngstown. (See **33 CFR 110.1 and 110.85,** chapter 2, for limits and regulations.)

(214) Youngstown is a **customs port of entry.**

(215) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(216) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(217) Several marinas at Youngstown provide transient berthage, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, a launching ramp, mobile lifts to 20 tons, and hull and engine repairs. In 1977, depths of 6 to 14 feet were reported alongside the berths.

(218) A Canadian **anchorage area** is on the W side of the river about 2 miles above the mouth.

(219) **Lewiston, N.Y.,** on the E side of the river about 7 miles above the mouth, is the head of navigation on the lower Niagara River. In 1977, the village dock, reported to be in poor condition, had depths of 12 feet alongside.

(220) **Queenston, Ont.** is on the W side of the river opposite Lewiston. Sand is received at a 300-foot wharf owned and operated by D. G. Bawtinheimer, Ltd. In 1977, depths of 12 feet were reported alongside.

(221) The portion of the lower Niagara River upstream from Lewiston and Queenston to **American Falls** and **Horseshoe Falls** is considered not navigable because of a 4-mile section of heavy rapids. Several bridges and overhead cables cross this section of the river.

(222) **Canadian Waters.**–The S shore of Lake Ontario, westerly from the **International boundary** at the mouth of the Niagara River to the extreme W end of this lake, at Hamilton Harbour, is in Canada. Proceeding northerly and easterly, the N shore of Lake Ontario is in Canada going back to the head of the St. Lawrence River.

(223) In this chapter, for a detailed description of Canadian waters, consult **Canadian Sailing Directions, CEN303, Welland Canal and Lake Erie.**

(224) **Charts 14806, 14810, 14822, *2077.**–From the International boundary at the Niagara River, the Canadian shoreline extends W for 2.9 miles to **Four Mile Point,** thence SW for 11.5 miles past Port Weller and Port Dalhousie, and thence WNW for 25 miles to Hamilton Harbour at the W end of the lake. SW from Four Mile Point, deep water is about 0.7 mile offshore to the Port Weller entrance where the shoals extend 1.2 miles off. From Port Weller W to Hamilton Harbour, deep water is 0.5 to 1.5 miles offshore.

(225) A **danger area** of the Niagara-on-the-Lake Small Arms Range extends about 1.1 miles offshore, about 2 miles W of the mouth of the Niagara River. The intermittent use of the area is announced by local Canadian Coast Guard Marine Radio Broadcast and may also be advertised in local newspapers. The danger area is marked by buoys. (For details, consult the Annual Edition of Canadian Notices to Mariners.)

(226) **Charts *2042, 14810, 14822.–Port Weller Harbour, Ont.,** 8 miles SW of the Niagara River mouth, is the Lake Ontario terminus of the Welland Canal. The St. Lawrence Seaway Management Corporation of Canada administers the harbor.

(227) The following is extracted (partial) from **Canadian Sailing Directions CEN303, Chapter 1, Welland Canal.** It is to be noted that the units of miles are nautical miles.

(228) **Port Weller Harbour** *(43°14′N., 79°13′W.), an artificial harbour 23 miles SSE of Toronto, is the Lake Ontario entrance to the Welland Canal. Port Weller Harbour and the adjoining urban communities of Weller Park and Port Weller East are part of the city of* ***St. Catharines.***

(229) *Port Weller Harbour is administered by the St. Lawrence Seaway Management Corporation.*

(230) *(Port Weller Harbour and the navigational aids in the harbour are described in Sailing Directions booklet CEN 302-Lake Ontario. A marina on the east side of the Port Weller Harbour east breakwater is also described in Sailing Directions booklet CEN 302.)*

(231) *There is a pilot exchange point 1 to 2 miles north of Port Weller Harbour. For more information on pilotage, consult Sailing Directions booklet CEN 300-General Information, Great Lakes, the Annual Edition of Notices to Mariners and Radio Aids to Marine Navigation (Atlantic and Great Lakes).*

(232) ***Tugs, if required, are available from Port Weller Dry Docks Ltd.***

(233) *A tie-up wharf on the east side of Port Weller Harbour at Mile 1.3 is for the use of small craft waiting to enter the Welland Canal. There is a direct-line telephone to communicate with Lock Control. Other use of this wharf is not permitted.*

(234) ***Caution.**–A current of up to 1 knot has been observed between limit of approach signs L/A1 and L/A2 below Lock 1 when the lock is being emptied. Small craft near the tie-up wharf may be affected.*

**Welland Canal**

(235) ***Chart 2042.**–The route of the Welland Canal is not the same as that of its predecessors, particularly on the lower terrain north of the Niagara Escarpment. In general, the canal follows a north and south course between Lake Ontario and Lake Erie.*

## Welland Canal-Lock Information

| Lock No. | Type | Usable length m and (ft) | Width m and (ft) | Lift m and (ft) | Miles from Port Weller Harbour |
|---|---|---|---|---|---|
| 1 | Single | 222.5 (730) | 24.38 (80) | 14 (46) | 1.58 |
| 2 | Single | 222.5 (730) | 24.38 (80) | 14 (46) | 3.12 |
| 3 | Single | 222.5 (730) | 24.38 (80) | 14 (46) | 5.47 |
| 4 | Double | 222.5 (730) | 24.38 (80) | 15 (49) | 6.60 |
| 5 | Double | 222.5 (730) | 24.38 (80) | 15 (49) | 6.74 |
| 6 | Double | 222.5 (730) | 24.38 (80) | 13 (43) | 6.90 |
| 7 | Single | 222.5 (730) | 24.38 (80) | 14 (46) | 7.40 |
| 8 | Guard | 350 (1,148) | 24.38 (80) | 0.5-3.5(2-11) | 21.09 |

## Welland Canal-Mileage and General Data

| Mile | Structure, Locality, etc. | Mile | Structure, Locality, etc. |
|---|---|---|---|
| 0.00 | Lake Ontario entrance-Port Weller Harbour | 12.92 | Turning Basin No. 2 |
| 1.10 | Wharf 1-Port Weller Harbour (East) | 13.27 | Syphon Culvert |
| 1.15 | Wharf 2-Port Weller Harbour (West) | 15.41 | East Main Street Tunnel |
| 1.30 | Small-craft wharf | 16.85 | Wharf 10 - Welland |
| 1.58 | Lock 1 - Single | 17.46 | Townline Tunnel |
| 1.85 | Port Weller Dry Docks | 19.80 | Wharf 11 - Canada Starch Company |
| 3.12 | Lock 2 - Single | 20.10 | Entrance to Rameys Bend |
| 4.50 | Wharf 3-St. Catharines wharf | 20.60 | Turning Basin No. 3 |
| 5.47 | Lock 3 - Single | 20.60 | Wharf 12 - Rameys Bend |
| 6.60 | Lock 4 - Double | 20.75 | Wharf 13 - Robin Hood Multifoods |
| 6.74 | Lock 5 - Double | 20.75 | Wharf 14 - R.E. Law |
| 6.90 | Lock 6 - Double | 20.75 | Tailrace from Supply Weir |
| 7.40 | Lock 7 - Single | 21.09 | Lock 8 - Guard Lock |
| 7.92 | Thorold Tunnel | 21.87 | Wharf 15 - Port Colborne |
| 8.10 | Wharves 5 and 6 - Thorold | 22.05 | Small-raft wharf |
| 8.10 | Turning Basin No. 1 | 22.27 | Wharf 16 - Port Colborne |
| 8.20 | Wharf 7 - Ontario Paper Company | 22.45 | Wharf 17 - Port Colborne |
| 8.30 | Guard Gate Cut | 22.50 | Wharf 18 - Port Colborne |
| 8.48 | Wharf 8 - Ontario Paper Company | 22.80 | Wharf 19 - Port Colborne |
| 8.85 | Wharf 9 - Beaverboard Wharf | 22.80 | Wharf 20 - Port Colborne |
| 10.05 | Intake Weir - Third Canal Channel | 23.45 | Lake Erie entrance - Port Colborne Harbour |
| 12.66 | Port Robinson Ferry | | |

(236) *The first 6.3 mile stretch of the canal, heading south from Lake Ontario, is flanked by slightly rising lowlands known as the Garden of Canada because of their natural beauty and extensive fruit orchards. In this section, the first three locks raise vessels 42 m (138 ft) from the level of Lake Ontario and bring them to the foot of the Niagara Escarpment. The long, straight reaches of canal prism provide ample space for the movement and passage of upbound and downbound vessels.*

(237) *The next four locks raise vessels to the top of the escarpment. Three of these locks are built in steps, one after the other, so that vessels are raised another 43 m (141 ft) in a distance of 0.5 mile. This stepped system of three locks has a pair of locks for each lift, one for upbound vessels and one for downbound vessels, thereby avoiding delays. From here there is a short stretch of canal prism, 0.4 mile long, which allows vessels to pass each other. At the south end of this short stretch of canal is the last of the seven main locks, which raises vessels 14 m (46 ft), nearly to the level of Lake Erie.*

(238) *A new Welland Canal by-pass was opened in 1973. The by-pass section, lying east of this part of the Fourth Welland Canal, stretches from Port Robinson southward to Rameys Bend, a distance of 7 miles. This stretch replaced a narrow 7.5 mile section, spanned by six bridges, that wound through the city of Welland. In contrast to the old section, along which bulky structures often blocked the line of sight, the Welland Canal by-pass channel is unobstructed and almost straight.*

(239) *Along the section from Rameys Bend to the Port Colborne entrance at Mile 23.45, the canal and its structures, including Guard Lock 8, are part of the original Fourth Welland Canal.*

(240) *Five vertical-lift bridges, six bascule bridges and one fixed-span high-level bridge cross the canal; these* ***bridges*** *carry railway lines and highways. The vertical-lift bridges operate on the principle of the counter-balanced elevator, with a movable span that lifts to provide a* ***vertical clearance*** *of 36.6 m (120 ft). They offer a less restricted channel than is available with the bascule bridges that are more common on navigable waterways. All bascule and vertical-lift bridges have auxiliary power in case of power failure.*

(241) *Lights are shown from all bridges in the Welland Canal. Details of aids to navigation for passage through the locks are given in the Seaway Handbook.*

(242) ***Guard lock and water level fluctuation.****–On Lake Erie, with its vast expanse of shallow water, the water level is subject to rapid fluctuations caused by changes in the force and direction of the wind. A change in wind direction from east to west has been observed to change the water level by as much as 3.4 m (11 ft) at Port Colborne. Such a change in water level, if transferred to the summit level of the canal, would introduce tremendous hydraulic control problems and extensive traffic delays. For this reason, Lock 8 was constructed at Port Colborne, just north of where the canal joins Lake Erie, to raise or lower ships from the regulated level of the canal to that of the lake.*

(243) *(Information on seiches and wind effect in Lake Erie is given in Sailing Directions booklet CEN300-General Information, Great Lakes.)*

(244) *About midway between Lake Ontario and Lake Erie, the Welland Canal crosses* ***Welland River****; this is a sluggish stream which joins Niagara River at the head of the rapids above Niagara Falls. The level of Welland River is 1.8 m (6 ft) below the level of the Welland Canal, which meant that an underpass had to be built to carry its waters under the canal. The foundation of this structure, which is an inverted syphon culvert, lies 25 m (82 ft) below the level of the water in the canal. Welland River no longer flows directly into the Niagara River; its waters are diverted through the Chippawa-Queenston power canal.*

(245) *Cross winds can cause serious delays to navigation in restricted waterways. To reduce this effect, many fast-maturing native trees have been planted as a windbreak along the banks of the Welland Canal. The roots of these trees also bind together the earth embankment of the prism reaches and provide a greater measure of protection against the erosive action of water.*

(246) *(Information on vessel traffic under adverse wind conditions is given in the Seaway Handbook.)*

(247) ***Safety features.****–Upper lock gates are protected from upbound vessels by a heavy concrete breast wall at the upper end of each lock; this wall prevents an upbound vessel from damaging the upper gates when entering a lock at the lower level. The lower gates are protected from downbound vessels by a wire rope fender across the lock.*

(248) *All controlling equipment operating the valves, gates, fenders and signals at each lock is interlocked to protect the equipment and to prevent disaster.*

(249) *(The facilities of the Welland Canal are listed in the table Wharves-Welland Canal.)*

(250) ***Lock 1*** *is 1.6 miles south of the entrance to Port Weller Harbour;* ***Bridge 1****, a bascule bridge, crosses the south entrance of the lock.*

(251) *The canal widens out 0.1 mile south of Bridge 1 to form a basin and fitting out berth on its east side. Port Weller Dry Docks Ltd., a division of Canadian Shipbuilding and Engineering Ltd., operates a shipbuilding and repair facility on the east side of the basin. Two* ***dry docks*** *here can handle vessels up to 222.5 m (730 ft) long and 23.2 m (76 ft) wide. The channel leading to the dry docks, flanked on the north side by dolphins, is reported to be dredged to a depth of 7 m (23 ft). These are the only dry docks in the Lake Ontario area that can handle vessels of this size.*

(252) *(Other shipyards in the Great Lakes area are listed in Sailing Directions booklet CEN 300-General Information, Great Lakes.)*

(253) *A* ***submerged water pipeline*** *crosses the basin in the approach to the dry dock. A* ***submerged natural gas pipeline*** *crosses the canal at Mile 2.4.*

(254) ***Lock 2*** *is entered at Mile 3.12;* ***Bridge 3A****, a bascule bridge, crosses the south entrance of the lock.*

(255) *The city of* ***St. Catharines****, with a population of 129,300 (1991), extends 8 miles south of Port Weller Harbour on both sides of the Welland Canal.*

(256) *A* ***submerged natural gas pipeline*** *crosses the canal near Mile 4; a submerged sewer pipeline crosses at Mile 4.65. A* ***submerged telephone cable*** *crosses the canal 0.1 mile farther south.*

(257) ***Bridge 4A****, a high-level bridge known as Garden City Skyway, crosses the canal at Mile 4.8; Bridge 4, a double bascule bridge, crosses at Mile 4.9.*

(258) *A* ***submerged power cable*** *and a* ***submerged telephone cable*** *cross the canal near Bridge 4.*

(259) ***Lock 3*** *is entered at Mile 5.47.*

(260) ***Caution.****–The outflows north of Locks 2 and 3 from pondage pools cause* ***eddies*** *and* ***cross currents*** *in the lower approaches to these locks.*

(261) ***Bridge 5****, a lift bridge known locally as the Glendale Avenue Bridge, is 0.53 mile south of Lock 3.*

(262) *Two* ***submerged natural gas pipelines*** *cross the canal 30 m (98 ft) south of Bridge 5. A* ***submerged power cable*** *and* ***overhead power cables****, with a clearance of 46 m (151 ft), cross the canal 0.1 mile farther south.*

## Welland Canal-Wharves

| Wharf No. | Name/Locality | Wharf length ft (m) | Depth † ft (m) | Elevation †† ft (m) | Remarks |
|---|---|---|---|---|---|
| | | **Note: All information in this table was provided by local authorities. User should consult local authorities for latest conditions.** | | | |
| 1 | Port Weller Harbour East | 194 (638) | 8.2 (27) | 2.6 (9) | Self-unloaders and rental cranes. Various partial cargoes. |
| 2 | Port Weller Harbour West | 393 (1,288) | 8.2 (27) | 26 (9) | Self-unloaders. Coal, sand, zircon ore, bulk sugar. Capacity 76500 tonnes. Diesel and Bunker C fuels available. |
| 3 | St. Catharines Wharf | 101 (330) | 7.6 (25) | 1.5 (5) | Closed. |
| 5 | Industrial Dock Thorold | 152 (500) | 6.4 (21) | 1.5 (5) | Self-unloaders. Coal. |
| 6 | Industrial Dock Thorold | West 343 (1,125)<br>East 91 (299) | 8.2 (27)<br>7 (23) | | One 2.7-tonne crawler crane.<br>One 3.2-tonne crawler crane. |
| 7 | Ontario Paper Wharf Thorold South | 185 (607) | 8.2(27) | 1 (3) | Pulpwood and chemicals. Capacity 90,000 cords pulpwood. |
| 8 | Ontario Paper Wharf Thorold | 132 (434) | 7 (23) | 1 (3) | Closed. |
| 9 | Beaverboard Wharf Thorold | 306 (1,004) | 7.1 (23) | 1 (3) | Closed. |
| 10 | Welland Dock, Welland | 223 (732) | 9.1 (30) | 2.4 (8) | Self-unloaders or rental cranes. |
| 11 | Canada Starch Dock,<br>Old channel mile 19.8 | 120 (394) | 8.2 (27) | | Three berthing dolphins. Self-unloaders. |
| 12 | Rameys Bend | 548 (1,798) | 8.2 (27) | | Tunnel and belt conveyor (loading). Stone and sand. |
| 13 | Robin Hood Multifoods Wharf | 305 (1,000) | 7.6 (25) | 1.5 (5) | Elevator. Grain and grain products. |
| 14 | R.E. Law Wharf | 213 (700) | 7.9 (26) | 1.5 (5) | Closed. |
| | **Port Colborne Harbour** | | | | |
| 15 | Underwater Gas Developers<br>Beam Building and Supply | 259 (850) | 4.3 (14) | 3.7 (12) | Self-unloaders. Sand. |
| 16 | Sniders Wharf | 451 (1,480) | 9.1 (30) | 3.7 (12) | One belt conveyor. Pipeline 17.8 to 20.3 cm (7 to 8 in).<br>Stone and marine diesel oil.<br>Capacity 27,000 tonnes. |
| 17 | Canadian Furnace Wharf | 341 (1,120) | 9.1 (30) | 3.7 (12) | Ore and limestone (unloading). Pig iron and scrap (loading). Capacity 225,000 tonnes. |
| 18 | 1. Fueling Wharves<br>2. West Street Wharf<br>3. | 503 (1,650) | 9.1 (30)<br>183 (600)<br>178 (584) | 2.4 (8)<br>3 (10)<br>4.3 (14) | Marine diesel fuel, coal.<br>Capacity 772,820 liters (170,000 gallons).<br>Closed. |
| 19 | Maple Leaf Milling | 183 (600) (north)<br>91 (300) (south) | 5.1 (17)<br>5.8 (19) | 2.4 (8) | Grain elevator. Capacity 63,000 tonnes. |
| 20 | Ports Canada Wharf | 183 (600) (slip)<br>274 (900) | 4.7 (15)<br>5.8 (19) | | Grain elevator. Closed<br>Capacity 84,000 tonnes. |
| | | **Holding (quarantine) wharf, out of service** | | | |

† Depth below chart datum. †† Elevation above chart datum.

(263) ***Bridge 6*** *(east and west), a railway bascule bridge, crosses the north entrance to Lock 4.*

(264) ***Twin Flight Locks 4, 5 and 6*** *are entered 1 mile south of Lock 3. These three pairs of locks are stepped and raise vessels a total of 43 m (141 ft).*

(265) *The Vessel Traffic Control Centre, Administration Building and Seaway Welland radio station are on the west side of the canal near the entrance to Lock 4.*

(266) ***Lock 7****, 0.35 mile south of Lock 6 (the highest of the flight locks), has a lift of 14 m (46 ft) and raises upbound vessels to the summit of the canal.*

(267) *The city of* ***Thorold****, with a population of 17,542 (1991), lies on the west side of the Welland Canal at Mile 7.5.* ***Thorold South****, part of the city of Thorold, is on the east side of the canal at Mile 8.*

(268) *(Details of the wharves at Thorold and Thorold South are listed in the table Wharves-Welland Canal.)*

(269) ***Turning Basin No. 1*** *is at Mile 8.1, 0.5 mile south of Lock 7.*

(270) *Three* ***submerged pipelines*** *cross the canal at the south end of Turning Basin No. 1; one is a natural gas line, one is a water line and the third is a culvert. A* ***submerged water pipeline*** *crosses the canal at Mile 8.6.*

(271) *The channel through the* ***Guard Gate*** *cut at Mile 8.3, 0.75 mile south of Lock 7, has a width of 59.4 m (195 ft).*

(272) ***Bridge 10****, at Mile 9.1, 0.8 mile south of the Guard Gate cut, is a railway lift bridge.*

(273) *The canal bottom for 2.2 miles south of Bridge 10 is solid rock.*

(274) ***Overhead power cables****, with a clearance of 46 m (151 ft), span the canal 0.1 mile south of Bridge 10.*

(275) *A* ***submerged pipeline*** *crosses the canal at mile 9.9; a* ***submerged natural gas pipeline*** *crosses at mile 10.2.*

(276) ***Caution.****–There may be strong cross currents at the entrance to the Third Welland Canal channel, on the west side of the canal near Mile 10.*

(277) **Allanburg**, *a rural community on the east side of the canal at Mile 10.35, is part of the city of Thorold.*

(278) ***Bridge 11****, at Allanburg, is a lift bridge.*

(279) ***Overhead power cables*** *with clearances of 40 to 46 m (131 to 151 ft) span the canal 0.2 to 0.9 mile south of Bridge 11. Two* ***submerged oil pipelines*** *cross the canal at Mile 12.*

(280) **Port Robinson**, *a rural community at Mile 12.6, is part of the city of Thorold.*

(281) *A small passenger* ***ferry****, operated by the St. Lawrence Seaway Management Corporation, crosses the canal at Port Robinson.*

(282) *A* ***submerged cable*** *and two* ***submerged gas pipelines****, one active and one abandoned, cross the canal near Port Robinson.*

(283) ***Turning Basin No. 2*** *is at Mile 12.9.*

(284) *The city of* ***Welland****, with a population of 47,914 (1991), is on both sides of the closed section of the Fourth Welland Canal, 7 miles north of Port Colborne. It is an important manufacturing centre with steel, iron, textile, twine, electrical equipment and rubber industries. It is served by the Canadian National Railway.*

(285) *(Details of the wharf at Welland are given in the table Wharves-Welland Canal.)*

(286) *Two* ***submerged cables*** *and many* ***submerged pipelines*** *cross the Welland by-pass section between Port Robinson and* ***Rameys Bend****, which is at Mile 20.1. A syphon culvert and two street tunnels also pass under this section of the canal. There are four* ***overhead power cables*** *with clearances of 43 m (141 ft).*

(287) *Rameys Bend is the north entrance point of a slip which was part of the Third Welland Canal. There is a salvage yard and dry dock at the south end of this slip.*

(288) *The* ***dry dock*** *on the west shore near the south end of the slip, operated by Marsh Engineering Ltd., is 82.3 m (270 ft) long and 18.3 m (60 ft) wide with a sill depth of 2.6 m (9 ft) in 1994.*

(289) *A* ***submerged power cable*** *crosses the slip near the entrance.*

(290) *The bottom of the Welland Canal from Rameys Bend to the Lake Erie entrance is solid rock.*

(291) (Details of the wharves near Rameys Bend are listed in the table Wharves-Welland Canal.)

(292) ***Turning Basin No. 3*** *is 0.5 mile south of Rameys Bend at Mile 20.6.*

(293) *The Robin Hood Multifoods Inc. elevator and mill are at Mile 20.7. These structures are conspicuous.*

(294) ***Caution.****–An unused section of the Third Welland Canal enters the channel from the SW at Mile 20.7, near the Robin Hood Multifoods Inc. elevator. This section of the canal serves as the tailrace of the supply weir. The moderate* ***current*** *here may affect vessels in Turning Basin No. 3 or berthing at Wharves 12 and 13.*

(295) ***Lock 8****, entered at Mile 21.1, has a lift of 0.6 to 3.4 m (2 to 11 ft), depending on the Lake Erie water level at Port Colborne.*

(296) ***Bridge 19*** *and* ***Bridge 19A****, both bascule bridges, cross the north and south entrances to Lock 8.*

(297) *A* ***submerged supply line*** *for an air bubbler system crosses the canal at the south end of the approach wall south of Lock 8.* ***Submerged water*** *and* ***sewage pipelines*** *cross the canal at Mile 21.85.*

(298) ***Bridge 20****, a railway lift bridge, and* ***Bridge 21****, a road lift bridge, are near Mile 22.*

***Port Colborne***

(299) ***Charts 2042, 2120.****–The harbour at* ***Port Colborne*** *(42°52′N., 79°15′W.),* 17 miles west of the United States city of Buffalo, is on the north shore of **Gravelly Bay** *at the south of Lake Erie entrance to the Welland Canal. It consists of an outer harbour, which extends from the original shoreline to offshore breakwaters, and an inner harbour, which includes the facilities for 2.5 miles along the Welland Canal.*

(300) *The outer harbour is protected by breakwaters. The west breakwater, which is 0.7 mile long and constructed of stone-filled timber crib work covered with concrete, extends towards Sugar Loaf Point. A west breakwater extension extends 0.35 mile in a SSE direction; it is built of concrete cribs and a concrete superstructure, with armour stone on the WSW face and a concrete pierhead at its SSE end.*

(301) *The east breakwater is constructed of timber and concrete crib work, with stone rip-rap protection along the outer face. Its pierhead should be given a berth of 30 m (98 ft).*

(302) *A* ***submerged power cable*** *extends NNE from the west breakwater to a position on shore NNE of the Port Colborne Grain Terminal elevator.*

(303) *The main channel through the outer harbour has a least width of 107 m (351 ft) and is dredged to a depth of 8.2 m (27 ft). A dredged area on the west side of the channel leads to the wharves at the Port Colborne Grain Terminal and the Maple Leaf Mills Inc. plant. The dredged areas are marked by* ***buoys*** *and* ***light buoys****.*

(304) *Port Colborne is a* ***Customs vessel reporting station*** *for pleasure craft.*

(305) *The harbour at Port Colborne is administered by the St. Lawrence Seaway Management Corporation.*

(306) ***Landmarks.***–*The harbour can be identified from offshore by the Port Colborne Grain Terminal elevator and the flour mill and elevator of Maple Leaf Mills Inc. A white water tower 0.2 mile north of the grain terminal is conspicuous. The Sugar Loaf, west of Port Colborne, is also conspicuous.*

(307) ***Chart 2120.***–*Port Colborne light buoy E (554) is moored 2.7 miles SSW of the outer breakwater; this is a reporting buoy.*

(308) *There is an* ***anchorage area*** *SE of Port Colborne light buoy E in depths of 19.2 to 24 m (63 to 79 ft); this anchorage is for vessels waiting to enter Port Colborne. Anchorage is prohibited in the approaches to the harbour.*

(309) *There is a* ***dumping ground*** *north of the anchorage area.*

(310) *There is a* ***pilot exchange point*** *1 to 2 miles south of Port Colborne. For more information on pilotage, consult Sailing Directions booklet CEN 300- General Information, Great Lakes, the Annual Edition of Notices to Mariners and Radio Aids to Marine Navigation (Atlantic and Great Lakes).*

(311) ***Charts 2042, 2120.***–*Port Colborne Outer light (556), at the SSE end of the west breakwater extension, is shown at an elevation of 11 m (36 ft) from a white square structure, 7.6 m (25 ft) high, with a red upper part. The light is brighter over an arc of 30°* in a SSW direction. The light-structure is floodlit.

(312) *Port Colborne West Breakwater light (557), at the west end of the west breakwater, is shown at an elevation of 7.3 m (24 ft) from a white circular tower, 5.1 m (17 ft) high.*

(313) *Port Colborne Inner light (558), at the east end of the west breakwater, is shown at an elevation of 15.2 m (50 ft) from a white square structure, 13.1 m (43 ft) high, with a red upper part.Port Colborne Harbour light (559), a steering light on the east breakwater, is shown at an elevation of 9.8 m (32 ft) from the weather station tower. The light is visible from northward between bearings of 178°45′ and 180°45′; it helps upbound vessels navigating between Bridge 21 and a position abreast of the south end of Wharf 17. This light is maintained by the St. Lawrence Seaway Management Corporation.*

(314) *Port Colborne East Breakwater light (560), at the west end of the east breakwater, is shown at an elevation of 10.7 m (35 ft) from a white circular tower, 6.2 m (20 ft) high, with a green upper part.*

(315) *Port Colborne Entrance* ***range lights*** *are in line bearing* ***015.5°****. The front light (560.6), on Wharf 17, is shown at an elevation of 11.1 m (36 ft) from a white circular tower, 7.4 m (24 ft) high, with a fluorescent-orange triangular daymark with a black vertical stripe. The rear light (560.7) is shown at an elevation of 17 m (56 ft) from a white circular tower, 13.5 m (44 ft) high, with a fluorescent-orange triangular daymark with a black vertical stripe.*

(316) ***Chart 2042.***–*Port Colborne light buoy E3 (555), moored east of the south end of the west breakwater extension, marks the east edge of the channel.*

(317) ***Caution.***–*Three rock-filled timber cribs, with elevations of 3 m (10 ft), lie along the east side of the channel at the inner end of the outer harbour.*

(318) ***Caution.***–*Vessels using Wharf 16 should avoid the International Nickel Company* ***water intake****, which is on the east side of the harbour 580 m (1,903 ft) south of Bridge 21.*

(319) *The city of* ***Port Colborne****, with a population of 18,766 (1991), is on both sides of the harbour. The principal exports are grain, flour, cement, carbon blocks, graphite block, crushed stone and pig iron. Imports include coal, fuel oil, diesel fuels, grain, corn, iron ore, sand and gravel. The city is served by the Canadian National Railway and has highway connections to Canadian and United States cities.*

(320) *Fresh water, bunker fuels, provisions and ships stores are available.*

(321) *Ship repair facilities are available. For more information, contact the St. Lawrence Seaway Management Corporation.*

(322) *Tug assistance is not compulsory for docking. Towing service, when required, is normally arranged through vessel agents or owners.*

(323) *(Details of the wharves at Port Colborne are listed in the table Wharves-Welland Canal.)*

(324) *A tie-up* ***wharf*** *on the west side of Port Colborne inner harbour, south of Bridge 21, is for the use of small craft waiting to enter the Welland Canal. There is a direct-line telephone to communicate with Lock Control. Other use of this wharf is not permitted.*

(325) *There are marinas and a yacht club in Gravelly Bay west of Port Colborne.*

# 6. LAKE ERIE

(1) **Chart Datum, Lake Erie.**–Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Erie is an elevation 569.2 feet (173.5 meters) above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

**Dimensions, Etc.**

(2) Length, steamer track, Detroit River Lighthouse to Buffalo; 236 miles.

(3) Length (right line), clear of Point Pelee and Long Point; 241 miles.

(4) Breadth (right line), Ashtabula to Port Talbot; 57 miles.

(5) Depth, maximum recorded by NOS; 210 feet.

(6) Water surface of lake; 4,980 square miles (U.S.), 4,930 square miles (Canada).

(7) Entire drainage basin; 22,980 square miles (U.S.), 9,650 square miles (Canada).

(8) **General description.–Lake Erie** is the southeasternmost and fourth largest of the five Great Lakes. With a greatest depth of 210 feet, it is the shallowest of the lakes and the only one with a floor above sea level. The deepest part of the lake is generally at the E end, while the island region in the W part of the lake is the most shallow. The lake has an average depth of 62 feet. The lake is fed at the NW end by water from Lake Huron via St. Clair River, Lake St. Clair, and Detroit River. The only natural outlet of the lake is at the NE end through Niagara River. Welland Canal bypasses the falls and rapids of Niagara River and provides a navigable connection to Lake Ontario.

(9) The waters of Lake Erie E of Long Point are part of the St. Lawrence Seaway and are under the navigational control of the Saint Lawrence Seaway Development Corporation, a corporate agency of the United States, and the St. Lawrence Seaway Management Corporation of Canada. These agencies issue joint regulations covering vessels and persons using the Seaway. The regulations are codified in 33 CFR 401, and are also contained in the Seaway Handbook, published jointly by the agencies. A copy of the regulations is required to be kept on board every vessel transiting the Seaway. A schedule of the Seaway tolls is contained in the handbook. (See St. Lawrence Seaway, chapter 3, and **33 CFR 401,** chapter 2.)

(10) Extensive waterborne commerce is carried out between the ports on the lake as well as to and from the other lakes. The bulk of commerce on the lake radiates from the mouth of Detroit River to the various ports on the lake, to the Niagara River, and to Welland Canal. Most of the vessel traffic proceeds from the Detroit River through the N part of the island region and Pelee Passage. This is the most important channel of the lake. Vessels plying between Lake Erie and Lake Ontario are restricted in size by the locks in the Welland Canal; the maximum vessel dimensions are 730 feet overall length, 76 feet extreme breadth, and 26 feet draft.

(11) **Vessel traffic control.**–Lake Erie E of Long Point is Sector 7 of the St. Lawrence Seaway vessel traffic control system. The objective of the system is to provide safe and efficient scheduling of vessel traffic, efficient search and rescue coverage, information regarding pilot requirements to the pilot dispatch centers, marine weather broadcasts, and information on vessel location to all interested parties. St. Catharines traffic control center controls traffic in Sector 7 through "Seaway Long Point," VHF-FM channel 11.

(12) **Calling-in point.**–Upbound and downbound vessels shall contact "Seaway Long Point" on VHF-FM channel 11 when approximately abeam of the E end of Long Point, Ont. After initial contact, downbound vessels shall guard VHF-FM channel 16.

(13) Complete information on the traffic control sectors and their respective calling-in points is contained in the Seaway Handbook.

(14) **Vessel Traffic Service.**–The Canadian Coast Guard operates a Vessel Traffic Service in Canadian waters from Long Point in Lake Erie through the Detroit and St. Clair Rivers to De Tour Reef Light in Lake Huron. (See chapter 3 and the Annual Edition of Canadian Notices to Mariners for complete information.)

(15) **Fluctuations of water level.**–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, the lowest stages prevailing during the winter and the highest during the summer.

(16) In addition to the normal seasonal fluctuations, oscillations of irregular amount and duration are also produced by storms. Winds and barometric pressure changes that accompany squalls can produce fluctuations that last from a few minutes to a few hours. At other times, strong winds of sustained speed and direction can produce fluctuations that last a few hours or a day. These winds drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This type of fluctuation has a very pronounced effect on Lake Erie, because it is the shallowest of the Great Lakes and affords the least opportunity for the impelled upper water to return through lower return currents beneath the depth disturbed by storms. As a result, the water level in the harbors, particularly those at the ends of the lake, fluctuates markedly under the influence of the winds; the amount of fluctuation depends on the direction, strength, and duration of the wind. Fluctuations as great as 10 feet and lasting as long as 12 hours have been observed. September through April is the most likely period, particularly November, December, and January. At the E end of the lake, W winds pile up water in Buffalo Harbor and increase the depth in Niagara River, while E winds drive the water out of Buffalo Harbor and decrease the flow and depths in Niagara River. The winds produce exactly the opposite effect at the W end of the lake; the greatest effects are at Sandusky, Toledo, and the mouth of Detroit River. Intermediate points are not subject to level changes as great as those at the ends of the lake. Along the S shore, fluctuations caused by winds are generally less than 1 foot above or below normal; extreme fluctuations of about 2 feet above or below normal may occur.

(17) Water level information for the Buffalo area may be obtained by contacting Buffalo Coast Guard Group on VHF-FM channel 16; for the Toledo area by contacting Toledo Coast Guard Station, same channel; for the Gibralter area by contacting Detroit

Coast Guard Group, same channel. The information is given in whole inches above or below chart datum.

(18) **Weather, Lake Erie.**–Strong winds are mostly likely in autumn during the navigation season; November and December are the worst as gales blow 6 to 9 percent of the time. However, Lake Erie's maximum wind occurred in July, NNW at 87 knots. Reported by two vessels, these winds were triggered by an Independence Day (1969) squall line. Gales, however, are encountered less than 1 percent of the time from May through September. Summer winds blow mainly out of the S through W, particularly SW. These directions are also favored during other seasons along with northwesterlies and northeasterlies.

(19) The shallowness and orientation of Lake Erie make it susceptible to SW and NE winds, which can quickly raise dangerous seas and, if persistent, create a dangerous surge problem at both ends of the lake. Rough seas are most frequent in autumn and in the E half of the lake. Waves of 10 feet (3 m) or more can be expected up to 3 percent of the time in the E, while seas of 5 feet (1.5 m) or more are encountered 30 percent of the time lakewide; extremes of 15 to 20 feet (4.5 to 6 m) have been encountered.

(20) Poor visibility is mainly a spring and autumn navigational problem. Over open waters, spring is the most prevalent fog season. Visibilities of less than 0.5 statute mile (0.4 nm) occur up to 5 percent of the time. Visibilities of 2 statue miles (1.7 nm) or less occur 5 to 10 percent of the time during most of the navigation season. The shoreline is susceptible to both autumn radiation fogs and early spring advection fogs. Fog is more frequent along the N shore.

(21) The visibilities at **Simcoe, Ont.**, drop to less than 0.5 statute mile (0.4 nm) on an average of 46 days annually compared to a range of 15 to 23 days along the S shore. At Simcoe this includes about 4 to 6 days of fog per month in autumn and early spring, about twice as many days as Buffalo, Erie, or Toledo.

(22) Thunderstorms are responsible for some of the strongest winds on the lake. They are generally a problem from April through September, but can occur at any time. Over the open lake, they occur 1 to 3 percent of the time with a peak during the summer months. They are most likely between sunset and sunrise. Onshore they most often occur during the late afternoon, on 25 to 30 days annually. During June, July, and August, they blow on 5 to 10 days per month.

(23) **Ice.**–The W end of Lake Erie is very shallow and freezes rapidly, the time of occurrence depending heavily on the temperatures. The ice attains an average thickness of 7 inches and an average maximum thickness of 11 inches. In Maumee Bay, the ice forms a solid sheet about 12 to 18 inches thick. The track through the channel to Toledo remains open except for a 3-foot thickness of brash ice, a slush ice under the refrozen surface. In South Passage, the ice reaches a thickness of about 18 inches because of slight rafting and ridging. During severe winters, thicknesses to 24 inches and windrows 5 feet high have been observed. By mid-March, the ice in the W end of the lake starts to clear because of the temperatures and the prevailing W winds. The ice in this area is field ice and covers over an opened track.

(24) The central part of the lake remains open through January except for a few strips of thin ice. Growth is rapid in February, and high concentrations of thin ice develop by mid-month. By early March, medium-thickness lake ice predominates, with somewhat better conditions along the Canadian shore. Decay and clearing is rapid in mid-March, and the remaining pack is usually concentrated E of Long Point by the end of the month.

(25) In the E part of the lake, ice begins to form in early to mid-January and may reach a thickness of 8 to 12 inches by the end of the month. The solid ice increases to 16 to 20 inches thick by the end of February. In Buffalo Harbor, an average thickness of 9 inches and an average maximum thickness of 18 inches can occur. In the lake, the prevailing W winds usually jam and pack the ice to form considerable windrows. Extremely hard pressure ridges 3 to 4 feet thick are not uncommon in February and March. As the ice on the rest of the lake begins to break up, the winds force it into the E end of the lake, and it completely blocks the approach to Buffalo Harbor. The soft deteriorating ice forms mush ice about 3 to 6 feet deep, interspersed with pressure ridges 4 to 6 feet deep. The mush ice has been reported as much as 20 feet deep in places. Rafted ice fields 15 to 20 feet above the water level have occurred during severe winters; under these conditions, ice can persist thought late May. (See Winter Navigation, chapter 3.)

(26) **Submerged wellheads and pipelines.**–Mariners are cautioned that oil and gas drilling towers are temporarily established in various parts of Canadian waters of Lake Erie. These towers have a quick flashing white light and an automatic fog signal that sounds one blast of 2 seconds duration followed by 18 seconds of silence.

(27) There are many submerged gas pipelines and wellheads in Canadian waters Lake Erie. Most of them are shown on the charts. Damage to these structures can be extremely hazardous because the natural gas if flammable, is under pressure, and contains toxic chemicals. Mariners are cautioned not to anchor in the vicinity of the submerged structures.

(28) **Fish netting areas.**–In parts of Lake Erie that are intensively fished, gill nets, impounding nets, and trap nets may create a hazard to navigation. The areas most intensively fished and the principal type of nets employed are shown in an inset on NOS chart 14820. However, fishing gear may be encountered at any location in the lake.

(29) **Routes.**–The Lake Carriers' Association and the Canadian Shipowners Association have recommended, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Erie.

(30) Downbound: Vessels leaving the Detroit River for ports E of Middle Ground Shoal shall continue on course **164°** until 0.9 mile beyond **East Outer Channel Light 1E**; thence **095°** for 27 miles for **Pelee Passage Traffic Lighted Buoy P**; thence **122°** for 8.5 miles to pass one mile S of Southeast Shoal Light.

(31) Downbound vessels for Port Colborne or Buffalo, from point of departure, Southeast Shoal, shall lay a course of **071°** for 135 miles to pass not more than 9 miles off Long Point; then steer **054°** for 45 miles to Port Colborne or steer **063°** for 60 miles to Buffalo.

(32) Upbound vessels from Port Colborne or Buffalo, to a point on the S shore, E of Marblehead, lay a course to pass not over 5 miles off **Presque Isle Light.** The course from Port Colborne is **228°** for 62 miles, and the course from Buffalo is **236°** for 77 miles.

(33) Upbound vessels for Southeast Shoal from Port Colborne or Buffalo lay a course to pass not over 3 miles off Long Point. The course from Port Colborne is **241°** for 44 miles, and the course from Buffalo is **248°** for 60 miles; then steer **249°** for 134 miles to a position 1 mile S of Southeast Shoal.

(34) Upbound vessels for **Detroit River Light** departing from a position 1 mile S of **Southeast Shoal Light** shall steer **302°** for 8.5 miles to a position **323°** 1.75 miles from Pelee Passage Light, then steer **275°** for East Outer Channel Light 1E.

(35) For Toledo and Monroe, when 0.75 mile off Pelee Passage Light steer **272°** to pass 1.5 miles N of Middle Sister Island Light, thence to destination.

(36) It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on chart 14820, Lake Erie.

(37) **Pilotage.**–The following waters of Lake Erie are Great Lakes designated waters: in the approach to Welland Canal within an arc drawn 1 mile to S of the outer light on the W breakwater at Port Colborne (Port Colborne Outer Light); W of a line on a bearing of about 026° from Sandusky Harbor Breakwater Light to Southeast Shoal Light; and within a radius of 1 mile E of Sandusky Harbor Breakwater Light. Registered vessels of the United States and foreign vessels in these waters are required to have in their service a United States or Canadian registered pilot. The remaining waters of Lake Erie are Great Lakes undesignated waters; the above vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters. Registered pilots for the Welland Canal are supplied by Great Lakes Pilotage Authority, Ltd., St. Catharines, and for Lake Erie by Great Lakes Pilotage Authority, Ltd., St. Catharines, and Lakes Pilots Association. (See appendix for addresses.) Pilot exchange points are 1 to 2 miles S of Port Colborne and just below the Ambassador Bridge on the Detroit River. The pilot boat in the Detroit River, J. W. WESTCOTT II, has a black hull encircled by an orange band and a white cabin with the words "U.S. Mail" in black letters. (See Pilotage, chapter 3, and **46 CFR 401,** chapter 2.)

(38) **Principal ports.**–The principal ports on Lake Erie are Buffalo, N.Y.; Erie, Pa.; and Conneaut, Ashtabula, Fairport Harbor, Cleveland, Lorain, Huron, Sandusky, and Toledo, Ohio. Companies at several of the ports make above-the-waterline repairs to deep-draft vessels.

(39) **Charts 14822, 14832, 14833.–Niagara River above Niagara Falls.**–At its E end, Lake Erie becomes comparatively narrow and has its outlet in the Niagara River. From the head of the river, it is about 20 miles to the falls and rapids of **American Falls** and **Horseshoe Falls.** About 5 miles below the head, the river is divided into two channels by **Strawberry Island** and **Grand Island. Tonawanda Channel** and **Niagara River Channel,** the U.S. channels, lead to the E of these islands, and **Chippawa Channel,** the Canadian channel, leads to the W of these islands. At the lower end of Grand Island, the channels rejoin and lead for about 3.5 miles to the falls.

(40) The **International boundary** between the United States and Canada follows a general middle of the river course in the upper Niagara River from the head of the river downstream to the head of Grand Island where the river forks around the island. The boundary then follows Chippawa Channel and is generally less than 1,000 feet off the W shore of Grand Island until Chippawa Channel and Niagara River Channel join at the NW end of Grand Island. The boundary again follows a general middle of the river course around the S side of **Goat Island** and over Niagara Falls.

(41) **Chart Datum, Upper Niagara River.**– Depths and vertical clearances under overhead cables and bridges in the Niagara River from its confluence with Lake Erie to the head of navigation, the turning basin at Niagara Falls, NY, is as follows: from Lake Erie to the Black Rock Canal Lock is the Low Water Datum of Lake Erie, 569.2 feet (173.5 meters); from just below the Black Rock Canal Lock to the south end of Grand Island is the sloping surface of the river, when the water surface just below the lock is at 564.4 feet (172.03 meters) and the Huntley Station gauge (at Niagara Mohawk Power Corporation plant) reads 563.8 feet (171.85 meters);from the south end of Grand Island to the south end of Tonawanda Island is the sloping surface of the river, when the Huntley Station gauge reads 563.8 feet (171.85 meters) and the gauge at Tonawanda Island reads 563.4 feet (171.73 meters); from the south end of Tonawanda Island to the turning basin at Niagara Falls, NY, is the sloping surface of the river, when the gauge at Tonawanda Island reads 563.4 feet (171.73 meters) and the gauge at Power Plant Intakes reads 561.5 feet (171.13 meters).All elevations are above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

(42) **Fluctuations of Water Level.**–Variations in Lake Erie levels above or below Low Water Datum are reflected in Niagara River levels. The amount of the variation ranges from the full Lake Erie variation at the head of the river and gradually diminishes downstream to the vicinity of Chippawa, Ont., just above Niagara Falls.

(43) From Lake Erie, the fall of the Niagara River is about 10 feet to the head of the upper rapids near the junction with the Welland River. Just below the Welland River entrance, about 1.2 miles E of Goat Island, the Niagara waters begin their rapid descent to the level of Lake Ontario through the rapids above the falls, the great falls themselves, and the rapids below the falls. From the upper rapids, the fall of the river to Lake Ontario is about 316.5 feet.

(44) **Currents.**–For about 1.7 miles, from its head to just above Peace Bridge, the river is wide, shallow, and rocky, and the current is from 2 to 3 mph. Just above the Peace Bridge, the river becomes a narrow gorge for about 2 miles to the lower end of Squaw Island. In the upper part of this gorge, the river is shallow, and the currents are about 8 mph at low to mean river stages and 9 mph at high stages. In the lower part of the gorge, the river is deeper and somewhat wider.

(45) In August 1986, with water level at 4.8 feet above low water datum, speed of the current was 7.7 to 9.7 knots.

(46) Currents just below the International Bridge have speeds of 4 mph at low to mean river stages and 4.75 to 5 mph at high stages. In Tonawanda and Chippawa Channels, the currents vary from 1 to 4 mph.

(47) **Channels.**–Black Rock Canal is the recommended route from Lake Erie to facilities in the Niagara River below **Squaw Island.** The channel formerly dredged in the open river W of Bird Island and Squaw Island has shoaled to depths of 10 feet or less. The bottom in this reach is generally rocky, and the currents are strong and variable. Great care should be exercised in navigating this section of the river.

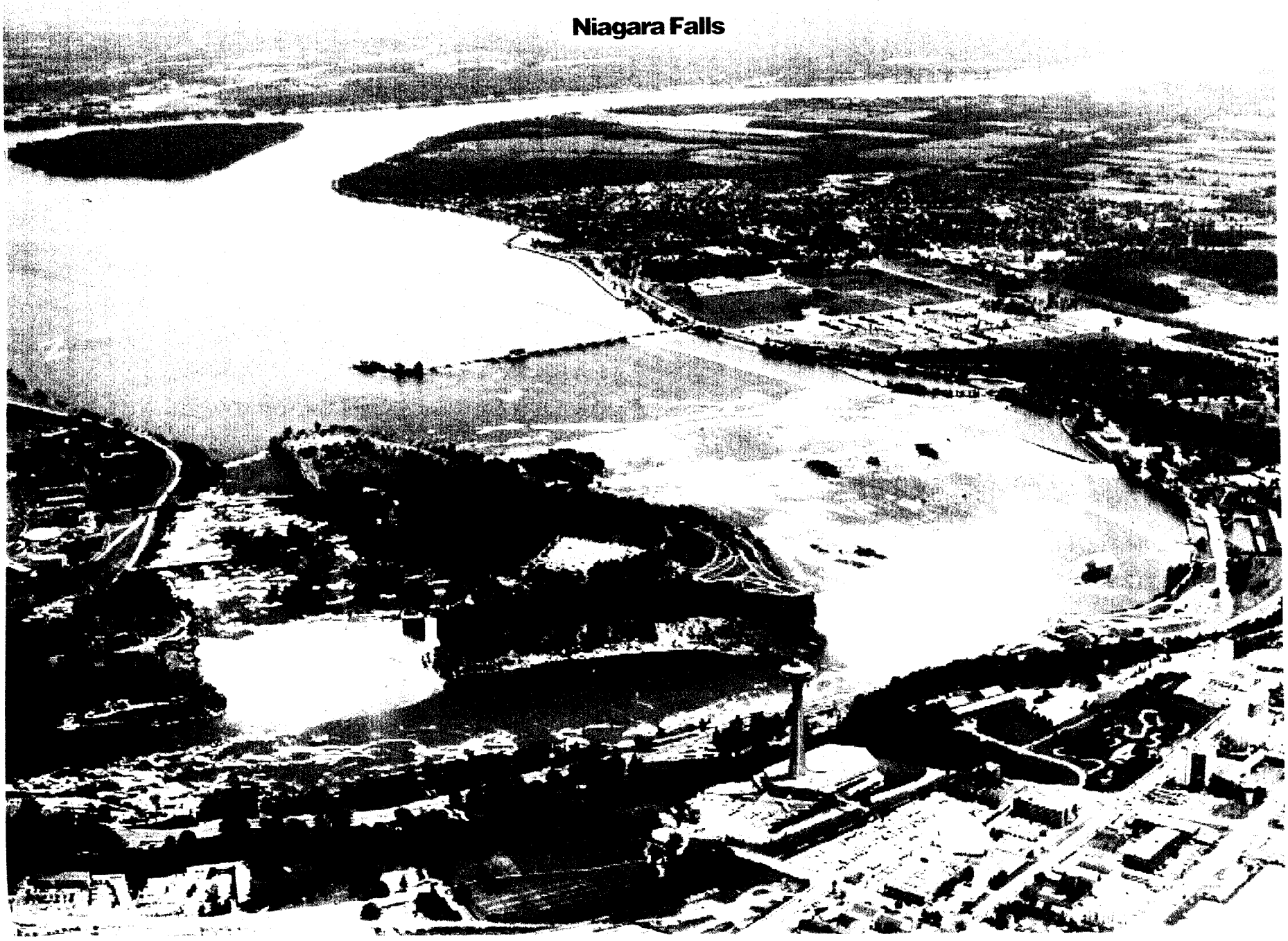
(48) A floating timber ice boom is placed across the entrance to the head of the river during the winter. In any one year, construction of the boom will not begin earlier than November 1, with completion not earlier than the first Monday in December. Disassembly of the boom will be accomplished by May 15 in any year.

(49) **Black Rock Canal** provides a safe passage for vessels around the rapids and shoals in the head of the Niagara River.

(50) The Lake Erie entrance to Black Rock Canal is through Buffalo Harbor North Entrance Channel and across the Outer Harbor Northern Channel to Black Rock Canal Entrance Channel. From its entrance, the canal leads northward along the Buffalo front, parallel with the river and separated from it by **Bird Island Pier** and Squaw Island. Bird Island Pier and Squaw Island retain the canal pool from the W, and, along with Black Rock Lock, serve to keep the canal level at the same elevation as the water surface of Lake Erie.

(51) From Black Rock Lock at the lower end of Squaw Island, the dredged channel extends to a point about 0.7 mile below

## Niagara Falls



**Pirates Island,** off the SE side of Grand Island, thence through the natural deep water of Tonawanda Channel. W of **Tonawanda Island,** the dredged channel continues to a turning basin on the N side of Tonawanda Island at North Tonawanda.

(52) From Buffalo North Entrance Channel through Black Rock Canal and Lock to and in the turning basin N of Tonawanda Island, the Federal project depth is 21 feet. (See Notice to Mariners and the chart for controlling depths.)

(53) From the downstream end of the turning basin at North Tonawanda, Niagara River Channel leads along the N side of Grand Island to a basin off the public dock at Niagara Falls, N.Y.

(54) Black Rock Canal and the dredged channels leading to the turning basin N of Tonawanda Island are marked by lights, buoys, and lighted ranges.

(55) Passing down the Niagara River from Lake Erie toward Niagara Falls is considered "proceeding from seaward." Buoyage in the river and the Black Rock Canal is based on this convention. Red buoys are on the right-hand side, looking downstream, and black on the left-hand side.

(56) **Black Rock Lock** connects the canal with the river near the foot of Squaw Island. The lock has a usable length of 625 feet with a clear width of 68 feet and a depth of 21 feet over the sills. The lock has an average lift of 5.2 feet.

(57) The lockmaster monitors VHF-FM channels 16 and 12, call sign WUD-21 or voice call Black Rock Lock. A vessel desiring passage through the lock is requested to contact the lockmaster by radio, or telephone 716-876-5454, well in advance of her arrival at the lock. (See **33 CFR 207.590**, chapter 2, for details on establishing early communications with the lockmaster.)

(58) Effective in 1969, all vessels transiting the Black Rock Canal shall adhere to the following when entering or departing the Black Rock Lock. These controls, including the whistle signal of two long and two short blasts, are in addition to the regulations and information otherwise noted in this Coast Pilot.

(59) 1. Maintain only that speed which is necessary to provide sufficient control of the vessel and reasonable headway.

(60) 2. Refrain from using bow thruster either in the lock chamber or in the canal from the signal light on the upper E wall to the lower end of the E wall.

(61) Vessels are requested to follow these procedures in order that damage to the operating gates may be prevented.

(62) Lockage for pleasure craft is scheduled downbound on the hour, upbound on the half hours, commercial traffic permitting.

(63) The following signals control the movement of vessels through Black Rock Lock:

(64) For downbound (northbound) traffic, a signal light mounted on a standard on the E approach wall at the entrance to the lock chamber shows green to indicate a clear entrance into the lock chamber. When this signal is red, the downbound vessel will moor at the E approach wall until such time as clear entrance to the lock is indicated by the green light.

(65) For upbound (southbound) traffic approaching the lock from the Niagara River channel, a signal light shows green to indicate a clear entrance to the lock chamber and red to indicate that the lock chamber is closed.

(66) **Bird Island** is on the W side of the Black Rock Canal about 1.3 miles below the entrance. Piers that enclose the canal extend S from Bird Island and N to connect with Squaw Island. A **special anchorage** is on the N and S sides of Bird Island. (See **33 CFR 110.1 and 110.84,** chapter 2, for limits and regulations.)

(67) **Caution.**–The canal generally has a slight current downstream. During rapidly rising or high water in Lake Erie, there is a strong crosscurrent at the S end of Bird Island Pier.

(68) **Bridges.**–Three bridges cross Black Rock Canal. Peace Bridge, 2 miles below the S entrance, has a fixed span with a clearance of 100 feet. An overhead power cable 0.2 mile below the bridge has a clearance of 144 feet. Ferry Street Bridge, 2.6 miles below the entrance, has a bascule span with a clearance of 17 feet for 86 feet from the E abutment, thence decreasing to 12 feet at the W abutment. The bridgetender monitors VHF-FM channel 16 and works on channel 12. International Bridge, with a combined rail and highway swing span 3.8 miles below the entrance, has a clearance of 17 feet. (See **33 CFR 117.1 through 117.49 and 117.769,** chapter 2, for drawbridge regulations.)

(69) **Regulations.**–A **speed limit** of 6 mph (5.2 knots) is enforced in Black Rock Canal. (See **33 CFR 162.175 and 207.590,** chapter 2, for canal regulations.)

(70) The canal has no docks or facilities for mooring large vessels. The Buffalo Yacht Club maintains a small small-craft basin on the canal adjacent to the Buffalo waterworks pumping station. Downstream from the yacht club basin, a berthing area about 12 feet deep has been dredged for the U.S. Naval and Marine Corps Reserve Training Center. Several small-craft facilities are on **Scajaquada Creek,** which enters the canal about 0.5 mile SE of the lock. Transient berths, gasoline, water, electricity, marine supplies, a launching ramp, a 4-ton mobile crane, and hull and gasoline engine repairs are available. In 1977, 4 feet was reported available in the approach and alongside the berths.

(71) **Peace Bridge** crosses the open Niagara River about 1.5 miles from the head. The bridge has several fixed spans with center clearances of 56 to 91 feet. The normal vessel route is under the fourth span from the U.S. mainland (the first being the bowstring truss over the Black Rock Canal). This span has a clearance of 67 feet at the center. An intake crib marked by a light is just downstream of the third span from the U.S. mainland. Navigation through this span is difficult in the turbulent current.

(72) An overhead power cable with a clearance of 126 feet crosses the river 0.2 mile downstream of Peace Bridge.

(73) **International Bridge** crosses the river about 1.5 miles below Peace Bridge. This railroad bridge has fixed spans with clearances of 22 feet. A swing span at the E end of the bridge, close W of Squaw Island, does not open for the passage of vessels. (See **33 CFR 117.803,** chapter 2, for drawbridge regulations.)

(74) Just below International Bridge on each side of the river are submerged flowmeter pilings about 13 feet below the water surface.

(75) **Fort Erie, Ont.,** is a community on the W side of the head of the Niagara River.

(76) **Lower Black Rock Harbor** is the name applied to the part of Buffalo which fronts on the Niagara River below Black Rock Lock. The harbor is about 0.75 mile long with the upper part between the lock and the mainland. Loaded vessels should use the Black Rock Canal to approach the harbor. Approaching from the open river, the current passing the guide pier below the Black Rock Lock creates a powerful eddy with water flowing upstream along the U.S. side for more than 0.5 mile below the lock. Caution is advised when entering the harbor or docking. The harbor has several marinas. Transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, a launching ramp, mobile lifts to 30 tons, and hull, engine, and electronic repairs are available. In 1977, depths of 7 to 12 feet were reported alongside the berths.

(77) Just below Black Rock Lock, **Strawberry Island** divides the Niagara River into Chippawa Channel and Tonawanda Channel, leading W and E, respectively, of Grand Island. **Chippawa Channel** extends from Strawberry Island for about 11 miles along the SW and W sides of Grand Island to **Navy Island** at the down-

stream end. The channel leads around either side of Navy Island and joins Niagara River Channel to flow to **Niagara Falls.** In 1982, Chippawa Channel had a reported controlling depth of about 9 feet with shallower depths along the shores. Both sides of Navy Island have good channels but care must be taken to avoid the shoals that extend off the S and NW tips of the island.

(78) Chippawa Channel has several small-craft facilities on both the Grand Island, United States, side of the channel and the mainland Ontario side. Beaver Island State Park Marina is at the S end of Grand Island. Transient berths, water, electricity, and sewage pump-out facilities are available. In 1982, depths of 10 feet were reported in the entrance with 8 feet alongside the berths. Big Six Mile Creek Marina is on the W side of Grand Island about 7.5 miles from the upper end of the channel. Transient berths, gasoline, water, electricity, sewage pump-out facilities, and launching ramps are available. In 1977, depths of 8 feet were reported in the entrance with 6 to 10 feet alongside the berths reported in 1982. A fixed highway bridge and two overhead cables crossing the entrance have a reported least clearance of 16 feet.

(79) The Niagara Parks Commission marina, on the Canadian side of Chippawa Channel opposite Beaver Island State Park, has gasoline, diesel fuel, and sewage pump-out facilities. Depths of 10 feet are reported alongside the marina wharf.

(80) **Tonawanda Channel** extends from Strawberry Island for about 8.5 miles along the E side of Grand Island to **Tonawanda Island** and the adjoining cities of Tonawanda and North Tonawanda. The dredged and natural channel through this stretch was previously described.

(81) **South Grand Island Bridge,** crossing the channel about 3.4 miles below Strawberry Island, has twin fixed highway spans with a clearance of 99 feet at the center of the central spans. Vessels requiring the full height should keep at least 90 feet from the face of the piers. Two overhead power cables with a minimum clearance of 115 feet cross the channel about 0.75 mile downstream of the bridge.

(82) **Wharves.**–Several deep-draft facilities are in Tonawanda Channel on the E side of the river. (For a complete description of the port facilities, refer to Port Series No. 41, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The depths alongside are reported depths. (For latest depths, contact the operators.)

(83) **C. R. Huntley, Station Coal Wharf**: (42°58′03″N., 78°55′47″W.); 753-foot face; 17 to 21 feet alongside; deck height, 10 feet; open storage for 450,000 tons of coal; rail connections; receipt of coal; owned and operated by Niagara Mohawk Power Corp.

(84) **Roblin Industries Wharf:** (48°59′00″N., 78°56′30″W.); 1,120-foot face; 1,410 feet with dolphins; 22 feet alongside; deck height, 8 feet; open storage for 20,000 tons of sand; tank storage for 162,000 barrels of asphalt; rail connections; receipt of sand and asphalt; owned by Roblin Industries and operated by various operators.

(85) **Newman Fuel Corp. Wharf:** about 700 feet S of South Grand Island Bridge; 250 feet of berthing space with dolphins; 22 feet alongside; deck height, 12 feet; storage tank capacity of 774,000 barrels; receipt of petroleum products; owned and operated by R. B. Newman Fuel Corp.

(86) **Ashland Oil Wharf:** about 0.3 mile NE of South Grand Island Bridge; 330 feet of berthing space with dolphins; 22 feet alongside; deck height, 7 feet; tank storage capacity of 974,000 barrels; receipt and shipment of petroleum products; owned and operated by Ashland Oil, Inc.

(87) Several marinas on both sides of Tonawanda Channel between Strawberry Island and South Grand Island Bridge provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Mobile lifts to 40 tons are available for hull, engine, and electronic repairs. In 1977, depths of 25 feet and less were reported alongside the berths.

(88) **Tonawanda Harbor,** about 12 miles via Tonawanda Channel below the head of the Niagara River, is the W terminus of the New York State Barge Canal. The harbor comprises the river frontage of **Tonawanda, N.Y.,** and **North Tonawanda, N.Y.; Tonawanda Creek,** which separates the two cities, for about 1,400 feet to the Main-Webster Street Bridge; and all of the waterfront of Tonawanda Island, which lies in the river off the main shore.

(89) The part of Tonawanda Harbor extending S from the North Tonawanda turning basin along the E side of Tonawanda Island has depths of about 15 feet with depths of 12 feet in Tonawanda Creek from the mouth to the highway bridge 0.2 mile above the mouth.

(90) **Bridges.**–Two bridges cross Tonawanda Harbor from the S part of Tonawanda Island to the mainland. Frederick B. Durkee Memorial Bridge is a fixed highway span with a clearance of 14 feet at the center. A railroad swing bridge just S has a clearance of 10 feet. (See **33 CFR 117.1 through 117.59 and 117.811,** chapter 2, for drawbridge regulations.)

(91) Three bridges cross the lower part of Tonawanda Creek. A railroad swing bridge just above the mouth has a clearance of 9 feet. (See **33 CFR 117.809,** chapter 2, for drawbridge regulations.) The bridge is maintained in the open position. Fixed highway bridges 0.2 and 0.3 mile above the mouth have clearances of 24 and 15 feet, respectively.

(92) A **speed limit** of 5 mph (4.4 knots) is enforced in the harbor and in Tonawanda and Ellicott Creeks within the Tonawanda and North Tonawanda city limits. The **harbormasters** of both communities and the sheriff of Erie County enforce these laws and can be contacted through their respective departments.

(93) Several marinas in the harbor provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and marine supplies. Mobile lifts to 40 tons are available for hull, engine, and electronic repairs. In 1977, depths of 8 to 13 feet were reported alongside the berths.

(94) The **New York State Canal System** is entered through Tonawanda Creek. (The canal system is described in chapter 14.)

(95) **Niagara River Channel**, a dredged channel, leads from the lower end of the turning basin at North Tonawanda along the N side of Grand Island to a basin off the public dock at Niagara Falls, N.Y. In 1992, the controlling depth in the channel was 12 feet. The channel is marked by buoys.

(96) **Cayuga Island,** close to the N shore of Niagara River Channel about 5 miles below Tonawanda Island, is separated from the mainland by **Little River,** which outlets at either end of the island. **Cayuga Creek** flows into Little River at about midlength of the island. Little River and Cayuga Creek afford a well-protected harbor for small craft. A dredged channel leads from deep water in Niagara River through the lower entrance to Little River. In 1977, the reported controlling depth was 5 feet. The upper entrance to Little River, marked by a private **344°** range, had a reported controlling depth of 4 feet in 1980. Depths inside are about 4 to 7 feet. A fixed highway bridge with a reported clearance of 10 feet crosses Little River just W of the mouth of Cayuga Creek. An overhead cable with a clearance of 55 feet crosses the river about 0.35 mile W of the bridge. A fixed highway bridge

crossing Cayuga Creek just above the mouth has a clearance of 9 feet.

(97) A marina on the N side of the lower entrance to Little River provides gasoline, ice, a launching ramp, a 2-ton lift, and hull and engine repairs.

(98) **Buckhorn Island** is at the NW end of Grand Island opposite Niagara Falls, N.Y. A two-section permanent flow control dike extends NW from the W end of Buckhorn Island closing off the former Buckhorn Channel. Lights mark the ends of the dikes.

(99) An unmarked **dumping ground** is between the dredged portion of Niagara River Channel and the NE end of Buckhorn Island; caution is advised.

(100) **North Grand Island Bridge,** a twin fixed highway bridge, crosses the river between Niagara Falls, N.Y., and Buckhorn Island. The vertical clearance is 44 feet through the central spans where Niagara River Channel passes. Two overhead power cables crossing the river about 0.5 and 0.7 mile below the bridge have clearances of 79 and 75 feet, respectively. Cable support towers in the river are marked by lights.

(101) **Niagara Falls, N.Y.,** is on the N shore of the Niagara River at the W end of Niagara River Channel. A public dock on the N side of the dredged basin at Niagara Falls provides 300 feet of berthing space with 4 feet reported alongside in 1977.

(102) **Weather, Niagara Falls.**–Niagara Falls, NY, located in extreme northwestern New York is on the isthmus between Lake Ontario and Lake Erie. The average annual temperature is 48°F (8.9°C) with an average maximum of 56°F (13.3°C) and an average minimum of 40°F (4.4°C). The all time extremes in temperature are 96°F (35.6°C) and -16°F (-26.7°C). July is the warmest month averaging 72°F (21.7°C) and January the coolest, averaging 24°F (-4.4°C). June through September have each recorded temperatures in excess of 90°F (32.2°C) and every month except June, July, and August have seen temperatures below freezing (0°C).

(103) The average annual precipitation for Niagara Falls is 33.93 inches (861.8 mm) which is fairly evenly distributed throughout the year. The wettest month is August with 4.31 inches (109.4 mm) and the driest, June, averages only 1.87 inches (47.5 mm). Snow fall averages about 66 inches (1676 mm) each year. December, January, and February each average greater than 15 inches (381 mm) per year with a slight maximum in January. Snow has fallen in every month except June, July, and August.

(104) The prevailing wind direction in Niagara Falls is southwest, off the lake, throughout the year.

(105) (See page T-2 for **Niagara Falls climatological table.**)

(106) Niagara Falls is a **customs port of entry.**

(107) SW of Niagara Falls, N.Y., Niagara River Channel and Chippawa Channel join, and the Niagara River, more than 1 mile wide at the junction, flows W for almost 3 miles to the falls. In this stretch above the falls, the river becomes quite shallow with numerous submerged rocks. The deeper water is generally close to the S shore W of Navy Island as far as Chippawa, Ont.

(108) **Chippawa, Ont.,** is on the S shore of the Niagara River about 1.8 miles above Niagara Falls, at the junction with the **Welland River.** At the junction of the two rivers are the intake structures of the Queenston plant of the Ontario Hydro-Electric Power Commission. Because of the intake structures, the flow of the Welland River has been reversed and is now from the Niagara River. Mariners are cautioned that the current in the Niagara River at the entrance to the Welland River is very strong. From the entrance, the power commission has dredged the Welland River to a depth of 30 feet for about 4 miles. Above this point, the controlling depth is about 6 feet. .

(109) The United States and Canadian Governments have designated the Niagara River for about 2 miles above the falls a safety zone. (See **33 CFR 165.1 through 165.7, 165.20 through 165.25, and 165.902,** chapter 2, for limits and regulations in U.S. waters.)

(110) Canadian Regulations Respecting Navigation on the Upper Niagara River.–1. These Regulations may be cited as the Upper Niagara River Regulations.

(111) 2. In these Regulations,

(112) (a) "Upper Niagara River" means the Canadian Waters of the Niagara River between the crest of Horseshoe Falls at Niagara Falls, Ontario, and the Peace Bridge at Fort Erie, Ontario; and

(113) (b) "vessel" means any ship or boat or any other description of vessel used or designed to be used in navigation.

(114) 3. No vessel shall navigate the Upper Niagara River downstream of a straight line joining the end of the breakwater at the mouth of the Welland River to the W side of the mouth of Gill Creek at Niagara Falls, New York, except for the purpose of saving life in an emergency.

(115) 4. The Minister of Transport may exempt any vessel from compliance with these Regulations.

(116) 5. (1) A person who violates the provisions of section 3, is guilty of an offence and liable on summary conviction to a fine not exceeding five hundred dollars.

(117) (2) A person who

(118) (a) operates any vessel contrary to the provisions of section 3;

(119) (b) is a party to any act described in paragraph (a); or

(120) (c) is the owner, charterer, hirer, master or person in charge of a vessel that is operated contrary to the provisions of section 3 shall be deemed to have violated those provisions unless, in any prosecution for such violation, he establishes that the act in respect of which the prosecution has been commenced took place without his consent and that he exercised all due diligence to prevent its commission.

(121) **Charts 14822, 14832, 14833.–Buffalo Harbor** is at the E end of Lake Erie, where the lake converges to an open and comparatively shallow bay about 8 miles across N and S and is subject to great storms from the SW. The lake discharges into the Niagara River at the NE corner of this bay. The city of **Buffalo, N.Y.,** is along the E lakeshore and the E bank of the head of the Niagara River. **Buffalo River** meanders through the city from E to W and enters the lake near the head of the Niagara River.

(122) Waterborne commerce at the port is in iron ore, limestone, iron and steel products, petroleum and coal products, grain, sand, tar, cement, salt, other minerals, and general and containerized cargo in the foreign and domestic trades.

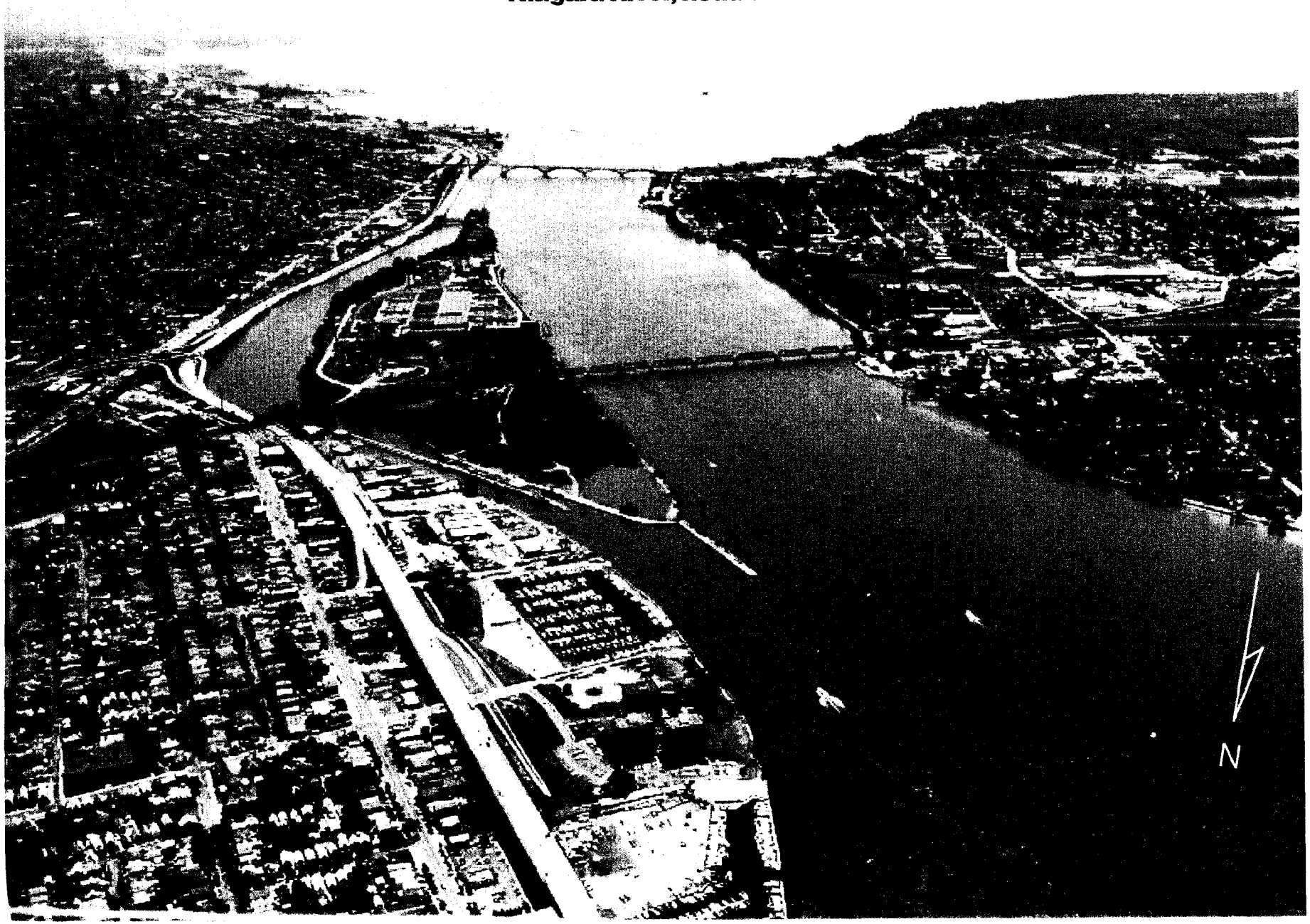
(123) **Prominent features.**–The stacks of Bethlehem Steel Corp. at Lackawanna near the S end of the harbor are the most conspicuous objects when approaching Buffalo Harbor. Also prominent are the Marine Midland Center and the City Hall tower in downtown Buffalo.

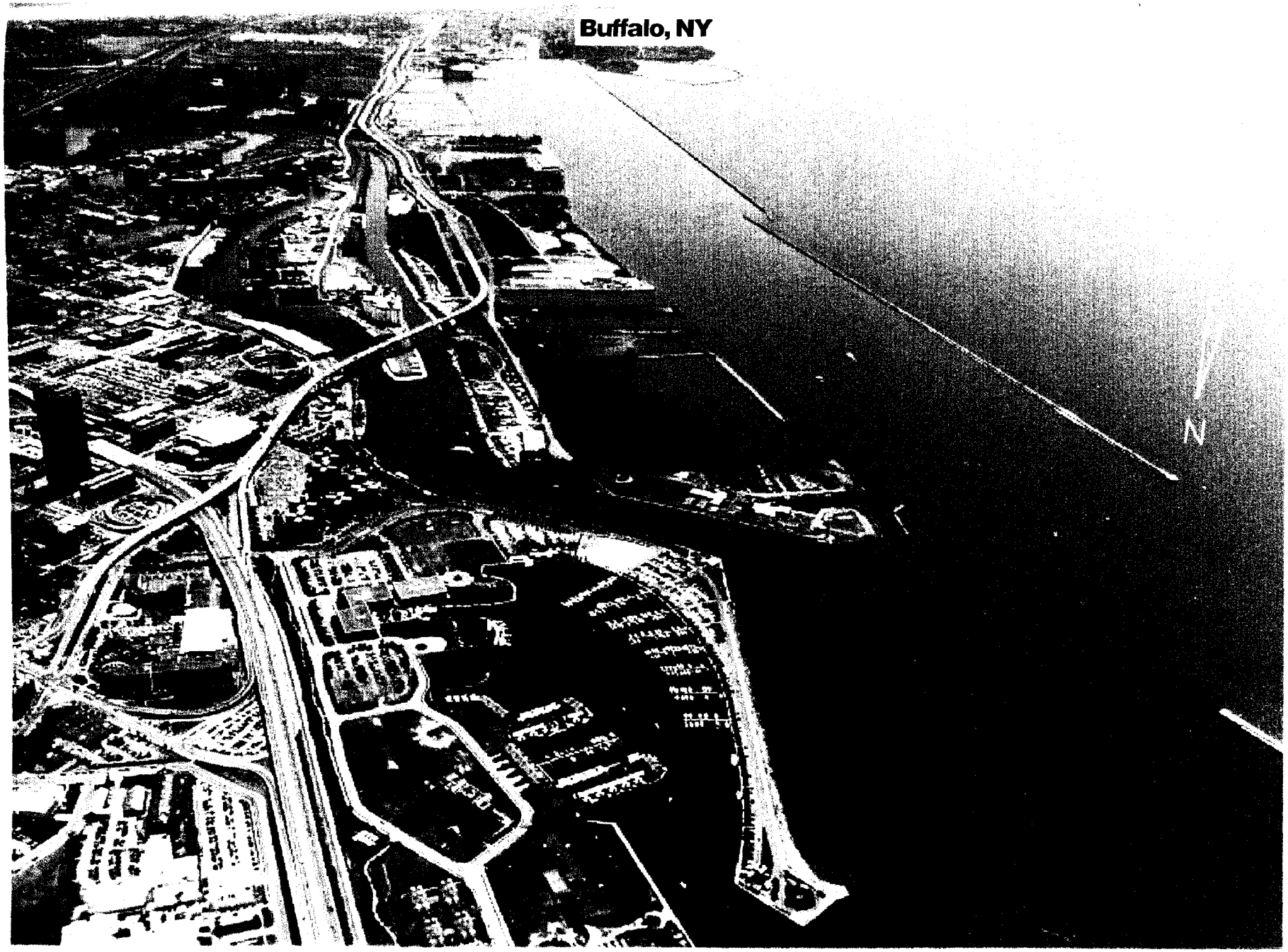
(124) **Buffalo Harbor Light** (42°52.2′N., 78°54.2′W.), 71 feet above the water, is shown from a white tower on a concrete base on the S end of the detached W breakwater on the N side of Buffalo Harbor North Entrance Channel. A fog signal is at the light.

(125) **Channels.**–A Federal project provides for an outer harbor formed by breakwaters parallel with the shore and an inner harbor comprising the Buffalo River and the Buffalo Ship Canal.

(126) **Buffalo Outer Harbor** has entrances at the N and S ends. From deep water in Lake Erie, **Buffalo Harbor North Entrance Channel,** marked by lights on the ends of the breakwaters and lighted buoys, extends NE into Outer Harbor and thence into two

**Niagara River, head of**




Buffalo, NY
N

waterways, Black Rock Canal and Buffalo River. Federal project depth in the channel is 25 feet. There is a strong N current across this channel; navigators should guard against this by holding up toward the S. **Buffalo Harbor South Entrance Channel,** marked by lights on the ends of the breakwaters, extends SE from deep water in the lake to Outer Harbor and thence into two canals, Union Canal and Lackawanna Canal. Federal project depth in the channel is 30-29 feet. (See Notice to Mariners and latest edition of charts for controlling depths.)

(127) Buffalo Outer Harbor provides a safe harbor of refuge and anchorage and is also used extensively by large lake vessels as a channel. Vessels seeking anchorage and small vessels passing along the breakwaters are cautioned against approaching them nearer than 100 feet in order to avoid striking the stone riprap. Federal project depths in Outer Harbor are 23 feet in Northern Channel, 27 feet in Middle Channel, 28 feet in Southern Channel, and 23 feet in the turning basin. The turning basin is marked by buoys. (See Notice to Mariners and latest edition of charts for controlling depths.)

(128) **Lackawanna Canal,** extends S for 0.75 mile from the S end of Outer Harbor. The entrance is marked by private lights. In 1973, the controlling depth was 25 feet with 24 feet along the dock on the W side and shoaling to 22 feet at the S end.

(129) **Union Canal,** marked at the entrance by a buoy and a private light, extends E for about 0.8 mile from the S end of Outer Harbor. In 1973, the midchannel controlling depth was 20 feet.

(130) Buffalo Inner Harbor comprises Buffalo River and Buffalo Ship Canal. The dredged section of **Buffalo River** extends SE and then generally E for about 5.8 miles from the N end of Outer Harbor to the ConRail railroad bridge. Federal project depth is 22 feet. However, the river is subject to extensive shoaling. The entrance to the river is marked by lights and buoys. (See Notice to Mariners and latest edition of charts for controlling depths.) Above the ConRail bridge, depths are 5 to 15 feet to the mouth of **Cazenovia Creek** and thence 1 to 6 feet to the Bailey Avenue Bridge. Submerged rocks immediately above Bailey Avenue Bridge render navigation for even small craft very hazardous.

(131) From about 1,000 feet downstream of the junction of the Buffalo River and Buffalo Ship Canal upstream for about 1 mile, the river bottom is soft clay and mud overlying rock to a depth ranging from 1 to several feet. Vessels grounding in this portion of the river are seldom damaged by contact with the bottom. Above this point for about 1 mile, the channel is cut through solid rock.

(132) **Buffalo Ship Canal** extends SE for about 1.4 miles from the inner end of Buffalo River Entrance Channel. The Federal project depth is 22 feet for about 1 mile. (See Notice to Mariners and latest edition of charts for controlling depths.)

(133) **Black Rock Canal Entrance Channel**, marked by lights and buoys, extends N from the N end of Outer Harbor. Federal project depth is 21 feet. (See Notice to Mariners and latest edition of charts for controlling depths.) **Black Rock Canal** is the navigable channel of the upper Niagara River as far N as **Tonawanda** and is discussed more fully under Niagara River. The Lake Erie W terminus of the Erie branch of the **New York State Canal System** is at Tonawanda.

(134) **Anchorages.**–The Outer Harbor is all good anchorage ground, except that the bottom is very soft clay S of the middle gap of the breakwaters. There are about 22 large mooring rings on the breakwater adjoining the North Entrance Channel and 25 on the breakwater adjoining the South Entrance Channel. Vessels are permitted to moor to the breakwaters with manila or synthetic lines, but not with wire rope or chains. Vessels are requested not to anchor N of Berthing Area 11. Vessels not longer than 550 feet will be permitted to anchor in Berthing Areas 11 through 17. However, no anchorage will be permitted in Berthing Areas 11 through 24 until vessel traffic to the Niagara Frontier Transportation Authority pier at the foot of Michigan Avenue has ended for the navigation season, and then only by permission from the District Engineer, U.S. Army Corps of Engineers, Buffalo, N.Y. Anchorage will be permitted in berthing areas S of Berthing Area 24 with no restrictions as to length of vessel. The berthing areas are all marked by large orange numbers painted on the harbor face of the breakwaters.

(135) Explosives anchorages are in Outer Harbor Middle Channel and on the S side of South Entrance Channel. (See **33 CFR 110.1 and 110.208,** chapter 2, for limits and regulations.)

(136) A special anchorage is in the small-craft basin on the E side of Outer Harbor. (See **33 CFR 110.1 and 110.84b,** chapter 2, for limits and regulations.)

(137) **Dangers.**–Numerous unmarked detached shoal spots with depths less than 30 feet are in the E end of Lake Erie, in the approaches to Buffalo Harbor and the Niagara River. **Waverly Shoal,** with a least depth of 10 feet, is 1.9 miles WSW of Buffalo Harbor Light. A buoy marks the S side of the shoalest part, and depths of 18 feet extend about 0.4 mile N and 0.9 mile S from the buoy.

(138) Unmarked 20-foot shoals are 1.4 and 2.6 miles SW of Buffalo Harbor Light.

(139) In May 1987, an artificial reef, marked by a buoy, was reported 1.9 miles SSE of Buffalo Harbor Light in about 42°50′41″N., 78°53′27″W.

(140) **Local bridge regulations.**–Sec. 305. Bridge Control and Traffic.

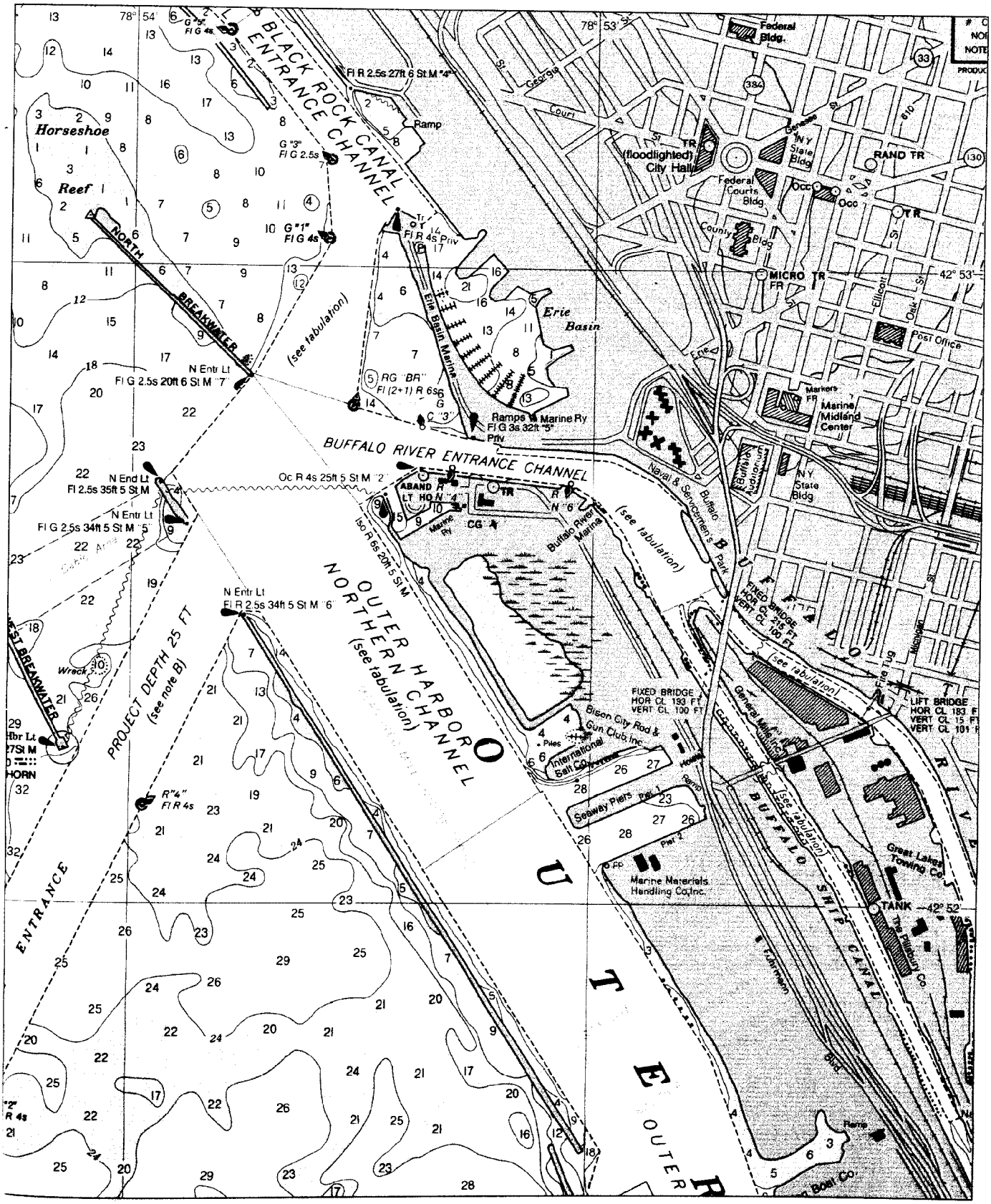
(141) (2) Whenever, between 6:30 a.m. and 8 p.m., at movable bridges over any portion of the harbor, persons, teams, or vehicles have been delayed at said bridge 10 minutes by reason of any such bridge being open for a vessel to pass, it shall be the duty of the bridgetender or other persons in charge thereof to give said signals and immediately close said bridge and keep it closed 10 minutes for such persons, teams, or vehicles to pass, if so much time shall be required, when said bridge shall be opened again and kept open for a like period, if necessary, for vessels to pass, and so on, alternately, if necessary, during the hours aforesaid.

(142) Sec. 307. Time to Remain Open.–Whenever any person having charge of any vessel shall wish to move the same past any bridge over any portion of the harbor, reasonable time shall be allowed for opening the same.

(143) Sec. 308. Fire and Police Vehicles-Right of Way.–Whenever at any alarm of fire any fire engine, hose cart, or other fire apparatus shall approach any bridge over the harbor, for the purpose of crossing the same toward such fire, the bridgetender shall, if such bridge is open, close the same as soon as practicable and keep it closed until such fire apparatus shall have had an opportunity to pass over said bridge, notwithstanding vessels may be delayed thereby. All vehicles of the fire department and the police department and vessels operated by either of said departments, shall have the right of way across or through any such bridge over all other traffic.

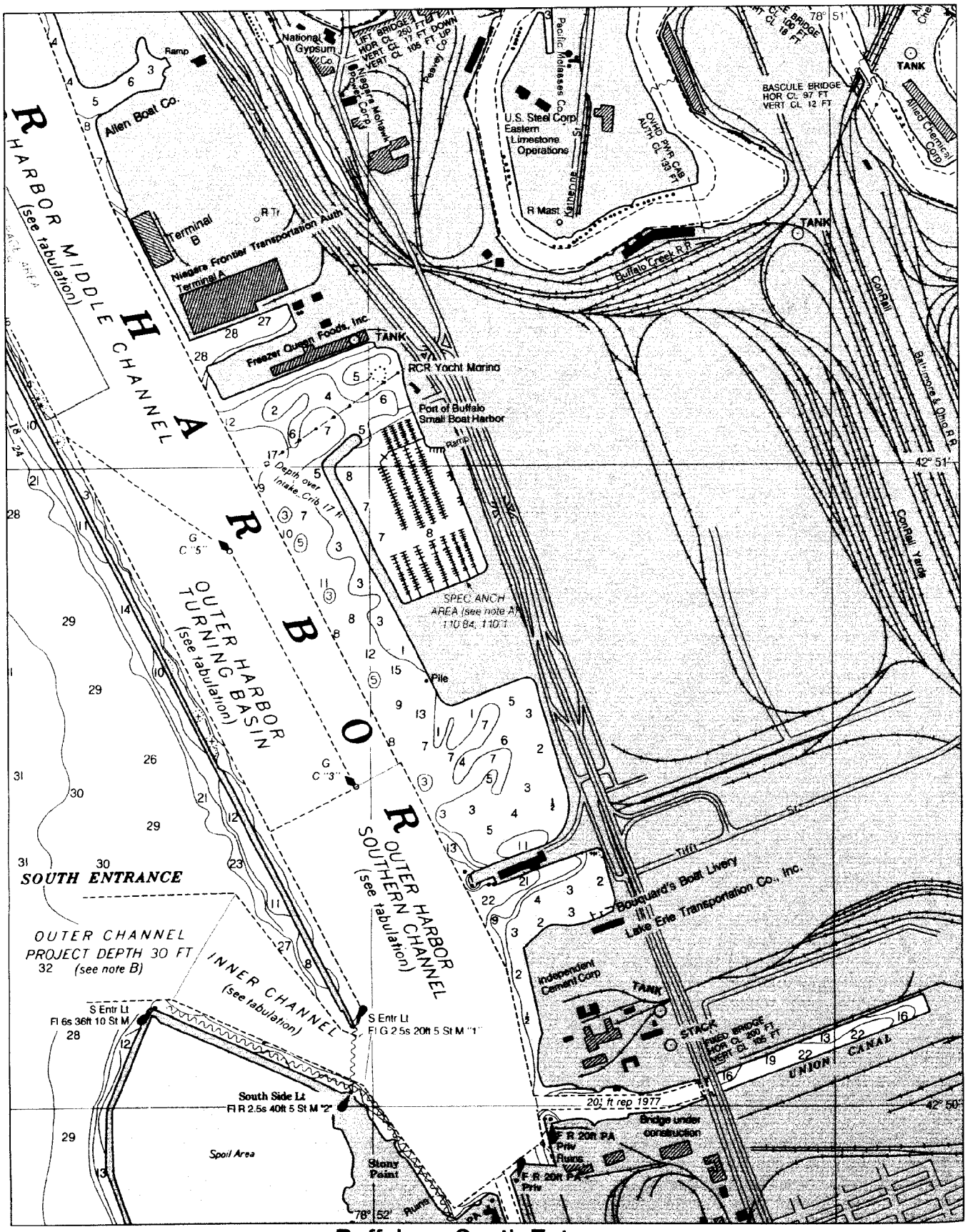
(144) Sec. 309. Vessel Signals.–It shall be unlawful for the owner, officer, or other person in charge of any vessel to attempt to pass any movable bridge across the harbor while a stop signal is being given or displayed.

(145) The commissioner of public works shall provide and maintain signals at the public highway bridges over the harbor, as required by the U.S. Commissioner of Lighthouses, for the security of navigation.




**Buffalo - North Entrance**

**Use Chart 14833 for Navigation**




# Buffalo - South Entrance

Use Chart 14833 for Navigation

## Structures across the Buffalo Waterways
### *Miles above North Breakwater South End Light
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Buffalo River** | | | | | | | |
| | Junction with Buffalo Ship Canal | | 0.97 | | | | | |
| 1 | Buffalo Skyway Bridge | Highway | 1.00 | | | 215 | 100 | Fixed. |
| 2 | Michigan Ave. bridge | Highway | 1.34 | | | 177 | 20 | Vertical lift. Clearance up 101 feet. Note 1. |
| 3 | Ohio St. bridge | Highway | 2.10 | | | 251 | 18 | Vertical lift. Clearance up 105 feet. Note 1. |
| 4 | Overhead cable | Power | 3.40 | | | | 133 | |
| 5 | ConRail bridge | Railroad | 4.02 | | | 100 | 18 | Bascule. Note 1. |
| 6 | ConRail bridge | Railroad | 4.39 | | | 97 | 12 | Bascule. Note 1. |
| 7 | Buffalo Creek RR bridge | Railroad | 4.39 | | | 97 | 12 | Bascule. |
| 8 | ConRail bridge | Railroad | 5.07 | | | 112 | 36 | Bascule. |
| 9 | South Park Ave. bridge | Highway | 5.22 | | | 200 | 19 | Vertical lift. Clearance up 95 feet. Notes 1 and 2. |
| 10 | ConRail bridge | Railroad | 5.79 | | | 104 | 25 | Bascule. Note 3. |
| | Junction with Cazenovia Creek | | 6.09 | | | | | |
| 11 | Bailey Ave. bridge | Highway | 6.24 | | | 91 | 17 | Bascule. |
| | **Cazenovia Creek** | | | | | | | |
| 12 | Overhead cable | Power | 6.19 | | | | | Data not available. |
| 13 | Bailey Ave. bridge | Highway | 6.22 | | | | 12 | Fixed. |
| | **Buffalo Ship Canal** | | | | | | | |
| 14 | Buffalo Skyway Bridge | Highway | 1.10 | | | 193 | 100 | Fixed. |
| | **Union Canal** | | | | | | | |
| 16 | Fuhrmann Blvd. bridge | Highway | 0.68 | | | 80 | 9 | Bascule. Note 4. |
| 17 | Father Baker Memorial Bridge | Highway | 0.70 | | | 200 | 105 | Fixed. Note 4. |

See **33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.

Note 1.—See **33 CFR 117.1 through 117.59 and 117.773,** chapter 2, for drawbridge regulations.

Note 2.—Clear height when raised is 95 feet at left channel limit increasing to 100 feet 25 feet channelward of right channel limit and 100 feet at right channel limit. Clear height when closed is 19 feet at left channel limit and 20 feet at right channel limit with an increased height of 21 feet over a width of 140 feet 50 feet channelward of the left channel limit and extending within 10 feet of the right channel limit.

Note 3.—Not operated until channel above bridge is opened to traffic.

Note 4.—Mileage is above South Buffalo North Side Light.

(146) The owner of any movable bridge over the harbor shall provide and maintain vessel signals, as required by the Commissioner of Lighthouses, or by ordinances of the city of Buffalo, for the security of navigation. During closed seasons of navigation, lights on bridges over the harbor and other structures in the harbor must be exhibited from sunset to sunrise at all times when vessels can enter port or are navigating in the vicinity.

(147) **Sec. 310. Railroad Bridges.**–For all bascule or swing bridges over any portion of the harbor not carrying highway traffic, when any vessel shall signal for its opening, the bridgetender shall immediately open the bridge, unless a train be on the bridge or approaching it so closely as to be unable to stop, and in that case the bridge shall be kept closed long enough for the passage of one train and no more.

(148) **Sec. 312. Steamboat Whistles.**–No person, firm, or corporation shall blow or cause to be blown the steam whistle of any vessel, for any purpose whatever, while lying at any wharf or dock in the city of Buffalo, or when approaching or leaving such wharf or dock, or when passing through any drawbridge over the harbor, or when running in the harbor, except when necessary as a signal

of danger and in cases and under circumstances prescribed by the laws and regulations of the United States and by the ordinances of the city of Buffalo.

(149) No captain or person in charge of a vessel in the Buffalo harbor shall permit any whistle upon such vessel to be blown except for the purpose of giving and answering signals; and no "four whistles" shall be answered by any vessel while lying at the dock.

(150) **Fluctuations of water level.**–The water level of Lake Erie at Buffalo is frequently affected, usually for periods of less than 12 hours, by strong SW or NE winds. It is reported that these winds may raise or lower water levels by as much as 6 feet. The record fluctuations recorded are 10½ feet above and 4½ feet below Low Water Datum.

(151) The records of the monthly mean stages at Buffalo show that the periods of lowest water during the navigation season are in the spring and fall, the latter being the busiest time of the year in the harbor, when the necessity for deep water is greatest.

(152) Water level information for the Buffalo area may be obtained by contacting Buffalo Coast Guard Group on VHF-FM channel 16. The information is given in whole inches above or below chart datum.

(153) **Currents.**–There is very little current in the outer harbor except during sudden fluctuations of water level, which may cause considerable current, especially in the entrance channels.

(154) The currents in the river are reported to reach velocities of 3 to 5 mph, changing direction and velocity abreast Buffalo Ship Canal. Rapid fluctuations in Lake Erie produce quite strong currents in the river within 1 mile of the mouth, inflowing or outflowing as the case may be. Heavy rainfalls and spring freshets are attended by strong outflowing currents due to rapid rises of the river and the consequent discharge of flood water. These conditions cause difficulties to navigation and sometimes damage to vessels by tearing them from their moorings, but occur only two or three times each year and for only a few hours at a time. With heavy rainfalls, it is reported that currents in the river sometimes reach velocities of 6 to 10 knots.

(155) **Weather, Buffalo and vicinity.**–Buffalo, NY, located on the extreme northeast shore of Lake Erie and in the western part of the state, averages about four days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 81°F (27.2°C) and an average minimum of 62°F (16.7°C). January is the coolest month with an average high of 31°F (-1°C) and an average minimum of 18°F (-7.8°C). The highest temperature on record for Buffalo is 99°F (37.2°C) recorded in August 1948; the lowest temperature on record is -20°F (-28.9°C) recorded in February 1961. About 131 days each year sees temperatures below 32°F (0°C) and an average 11 days each year records temperatures below 5°F (-15°C). Every month has seen temperatures below 50°F (10°C) and every month except June, July, and August has recorded temperatures below freezing (0°C).

(156) The average annual precipitation for Buffalo is 38.3 inches (972.83 mm) which is fairly evenly distributed throughout the year. Precipitation falls on about 236 days each year. The wettest month is November with 3.9 inches (99.1 mm) and the driest, February, averages only 2.5 inches (64 mm). An average of 30 thunderstorm days occur each year with July and August being the most likely months. Snow falls on about 106 days each year and averages about 90 inches (2286 mm) each year. December and January each average greater than 20 inches (508 mm) per year while February averages 18 inches (457 mm). Eighteen inch (457 mm) snowfalls in a 24-hour period have occurred in each month November through February and 38 inches (965 mm) fell in one 24-hour period during December 1995. About 19 days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June, July, and August. Fog is present on average 158 days each year and is evenly distributed throughout the year with a slight maximum in the spring and again in August.

(157) The prevailing wind direction in Buffalo is the southwest, off the lake. January is the windiest month and a maximum gust of 71 knots occurred in February 1967.

(158) (See page T-3 for **Buffalo climatological table.**)

(159) **Ice.**–Heavy ice forms in the river, usually in January. A narrow channel is kept open through the ice by tugs, but the ice remains in place because the E end of Lake Erie also freezes over, and the harbor entrance is usually blocked with ice from January to March or April. The ice usually goes out in the spring during a freshet in the river, and the combined effect of the then prevailing strong outflowing currents and the heavy moving ice is at times very great and may last for 2 or 3 days. During this time, the liability of damage to vessels is considerable.

(160) Heavy ice forms in the Buffalo Ship Canal in winter, usually in January. A narrow channel is kept open through the ice by tugs, but the ice remains in place, the same as in the Buffalo River. The ice drifts out on the opening of the entrance channel in March or April, or melts in place, and its breaking up in the spring is not attended with the same liability to damage as in the case of the Buffalo River.

(161) **Towage.**–Tugs to 1,250 hp are available at Buffalo. Arrangements for tugs are made through the Great Lakes Towing Co. dispatcher in Cleveland at 800-321-3663 or on VHF-FM channels 16, 10, 12, and 18A via remote antenna. The tugs' VHF-FM channels include 16, 6, 12, 14, and 18A. At least 2 hours advance notice is requested. City regulations require that all vessels which require the opening of one or more bridges while navigating in the Buffalo River must have the assistance of one or more tugs when approaching and passing these bridges. Vessels navigating stern first are required to have a tug on the stern and a tug on the bow.

(162) Buffalo is a **customs port of entry.**

(163) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(164) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(165) **Coast Guard.**–A **Marine Safety Office** is in Buffalo. (See appendix for address.) Buffalo Coast Guard Station and Group Office are on the S side of the entrance to the Buffalo River.

(166) **Harbor regulations.**–A **speed limit** of 6 mph (5.2 knots) is enforced in Buffalo Harbor except in the Outer Harbor where the speed limit is 10 mph (8.7 knots). (See **33 CFR 162.165 and 207.580**, chapter 2, for regulations.)

(167) Local harbor regulations are established by the Corporation Counsel and enforced by the **harbormaster,** who may be reached at City Hall. Vessels shall not approach or pass any movable bridge at a speed exceeding 3 mph (2.6 knots). Copies of the regulations may be obtained from the Corporation Counsel, City Hall, Niagara Square, Buffalo, N.Y. 14202.

(168) **Wharves.**–Buffalo has more than 60 piers and wharves in the Outer Harbor, the Buffalo River, and the Lackawanna, Union, and Buffalo Ship Canals. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 41, published and sold by the U.S. Army Corps

of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operators.) All of the facilities have direct highway connections, and most have rail connections. Water is available at many of the piers and wharves. General cargo at the port is usually handled by ship's tackle.

(169) **Facilities in Lackawanna Canal:**

(170) **Bethlehem Steel Corp., Steel Dock:** W side of Lackawanna Canal; 3,900-foot face; 27 feet alongside; deck height, 7½ feet outer section, 12½ feet inner section; open storage for 20,000 tons of limestone; seven storage tanks, 362,000-barrel capacity; three 20-ton gantry cranes; receipt of limestone and fuel oil; shipment of steel mill products; owned and operated by Bethlehem Steel Corp.

(171) **Bethlehem Steel Corp., Ore Dock:** E side of Lackawanna Canal; 3,975-foot face; 27 feet alongside; deck height, 12½ feet; four 17-ton hulett-type ore unloaders, unloading rate 650 tons per hour each; three traveling bridge cranes; four traveling hoppers which serve belt conveyor system; open storage for over 2 million tons iron ore, 250,000 tons limestone, 400,000 tons dolomite, and 1 million tons coal; receipt of iron ore, iron pellets, and limestone; owned and operated by Bethlehem Steel Corp.

(172) **Facilities in Union Canal:**

(173) **Bethlehem Steel Corp., Union Canal Dock:** S side of Union Canal W of highway bridge; 778 feet of berthing space; 20 feet alongside; deck height, 10½ feet; open storage for 400,000 tons of limestone or dolomite; receipt of limestone and dolomite; owned and operated by Bethlehem Steel Corp.

(174) **Hanna Furnace Corp., South Dock:** S side of Union Canal E of highway bridge; 2,235-foot face; 21 feet alongside; deck height, 10 feet; three traveling bridge cranes, operating rate about 225 tons per hour each; 490,000 square feet open storage; receipt of iron ore and limestone, shipment of pig iron; owned by National Steel Corp. and operated by Hanna Furnace Corp.

(175) **Hanna Furnace Corp., North Dock:** N side of Union Canal E of highway bridge; 1,635 feet of berthing space; 22 feet alongside; deck height, 12 feet; 270,000 feet of open storage; receipt of limestone and iron ore, shipment of pig iron; owned by National Steel Corp. and operated by Hanna Furnace Corp.

(176) **Independent Cement Co. Wharf:** N side of Union Canal W of highway bridge; 634 feet of berthing space; 22 feet alongside; deck height, 8 feet; belt conveyor serves storage silos with 100,000-ton capacity; open storage for 30,000 tons of slag; receipt of cement; shipment of slag; owned and operated by St. Lawrence Cement Co., subsidiary of Independent Cement Co.

(177) **Facilities in the Outer Harbor:**

(178) **Niagara Frontier Transportation Authority, Terminal A:** (42°51′14″N., 78°52′19″W.); 650-foot face, 27 feet alongside; S side 1,000 feet long, 27 feet alongside; deck height, 12 feet; 55-ton gantry crane, and one 25-ton crawler crane; 83,000 square feet covered storage; 172 acres open storage; receipt and shipment of general cargo; owned by Niagara Frontier Transportation Authority and operated by Marine Intercontinental Terminals of Buffalo, Inc.

(179) **Niagara Frontier Transporation Authority, Terminal B:** adjacent N of the face of Terminal A; 750-foot face; 23 to 27 feet alongside; deck height, 12 feet; 83,000 square feet covered storage; 1½ acres open storage; receipt and shipment of general cargo; owned by Niagara Frontier Transportation Authority and operated by Marine Intercontinental Terminals of Buffalo, Inc.

(180) **Niagara Frontier Transportation Authority, Seaway Pier No. 2:** (42°52′05″N., 78°52′52″W.); 1,179-foot north side; 23 to 25 feet alongside; deck height, 12 feet; two bulk material storage sheds; receipt and shipment of bulk commodities including sand, potash, salt, gypsum rock, china clay, limestone, and tallow; owned by Niagara Frontier Transportation Authority and operated by Marine Materials Handling Co., Inc.

(181) **Niagara Frontier Transportation Authority, Seaway Pier No. 1:** (42°52′09″N., 78°52′57″W.); 200-foot face, 27 feet alongside; S side 1,187 feet long, 24 feet alongside; N side 1,168 feet long, 24 feet alongside; deck height, 12 feet; belt conveyor serving vessel-loading spout; open storage for 50,000 tons of coke; shipment of coke; owned by Niagara Frontier Transportation Authority and operated by Mid-Continent Coal and Coke Co.

(182) **International Salt Co. Pier:** (42°52′13″N., 78°53′00″W.); 800-foot face; 17 feet alongside; deck height, 8 feet; open storage for 65,000 tons of salt; receipt of salt; owned and operated by International Salt Co., Inc.

(183) **Facilities in Buffalo Ship Canal:**

(184) **Sand Products Landing:** W side of canal about 1 mile above the entrance; 1,000-foot face; 13 to 20 feet alongside; deck height, 8 feet; open storage for 50,000 tons of sand; storage silo; receipt of sand; owned by Consolidated Rail Corp. and operated by Sand Products Corp.

(185) **Pillsbury Mutual Wharf:** E side of canal about 0.6 mile above the entrance; 1,520 feet of berthing space; 21 to 27 feet alongside; deck height, 8 feet; two traveling unloading towers, 10,000-bushel-per-hour capacity each; one loading tower, 11,000-bushel-per-hour capacity; receipt and shipment of grain; owned and operated by The Pillsbury Co.

(186) **General Mills Wharf:** E side of canal about 0.2 mile above the entrance; 1,025-foot face plus 700 feet of rock-revetted natural bank; 22 feet alongside; deck height, 8 feet; two marine legs, 25,000-bushel-per-hour unloading rate each; 4-million-bushel grain elevator; receipt of grain; owned and operated by General Mills, Inc.

(187) **Facilities in the Buffalo River:**

(188) **Huron Cement Co. Upper Wharf:** S side of river below Ohio Street Bridge; 475-foot face; 20 to 22 feet alongside; deck height, 10 feet; two unloading hoses extend to cement storage silos with 21,000-ton capacity; receipt of cement; owned and operated by Huron Cement Co., Division of National Gypsum Co.

(189) **Peavey Co. Wharf:** S side of river 800 feet above Ohio Street Bridge; 578-foot face; 24 feet alongside; deck height, 8 feet; two unloading towers, 25,000-bushel-per-hour capacity; two loading spouts, 17,000-bushel-per-hour capacity; 3¼-million-bushel grain elevator; receipt and shipment of grain, shipment of bulk and bagged flour; owned and operated by Peavey Co.

(190) **Standard Elevator Wharf:** N side of river above Ohio Street Bridge; 875-foot lower face, 19 to 22 feet alongside; 388-foot upper face, 16 to 20 feet alongside; deck height, 8 feet; two traveling unloading towers, 15,000-bushel-per-hour capacity; loading spout, 20,000-bushel-per-hour capacity; 5-million-bushel grain elevator; receipt and shipment of grain; owned by Standard Milling Co. and operated by Standard Elevator and Grain Division of Standard Milling Co.

(191) **Lake and Rail Elevator Wharf:** S side of river about 1,000 feet above the Peavey Co. Wharf; 535 feet of berthing space E face, 20 to 24 feet alongside; deck height, 10 feet; two traveling unloading towers, 12,500-bushel-per-hour capacity each; loading spout, 35,000-bushel-per-hour capacity; 4½-million-bushel grain elevator; receipt of grain; owned and operated by International Multifoods Corp.

(192) **Williams Paving Co. Wharf:** N side of river about 0.4 mile above Ohio Street Bridge; 750-foot face; 15 to 18 feet along-

side; deck height, 8 feet; open storage for 12,000 tons of material; receipt of sand and limestone; owned and operated by Williams Paving Co., Division of Greater Buffalo Press, Inc.

(193) **LTV Steel Co., Steel Loading Wharf:** S side of river about 0.5 mile below South Park Avenue Bridge; 600-foot face; 20 feet alongside; deck height, 12 feet; two 10-ton gantry cranes; 200,000-gallon storage tanks for liquid coke by-products; ½ acre open storage; shipment of steel bars, billets, ingots, and liquid coke by-products; owned and operated by LTV Steel Co., Buffalo Works.

(194) **LTV Steel Co., Ore and Limestone Dock:** S side of river immediately above Steel Loading Wharf; 1,188-foot face; 21 feet alongside; deck height, 15 feet; two traveling bridge cranes, 400-ton-per-hour unloading rate; open storage for 600,000 tons of iron ore and limestone; receipt of iron ore and limestone; owned and operated by LTV Steel Co., Buffalo Works.

(195) **LTV Steel Co., Oil Wharf:** S side of river about 0.3 mile above South Park Avenue Bridge; 237-foot and 323-foot bulkheads separated by 237 feet of natural bank; 16 feet alongside; deck height, 8 feet; pipelines to oil storage tanks; receipt of fuel oil; owned and operated by LTV Steel Co., Buffalo Works.

(196) **Mobil Oil Corp., Bulk Terminal:** N side of river about 0.4 mile above South Park Avenue Bridge; 1,470-foot face; 15 to 22 feet alongside; deck height, 12 feet; pipelines to oil storage tanks; receipt of petroleum products, fueling of small vessels; owned and operated by Mobil Oil Corp.

(197) **Supplies.**–Water, provisions, and marine supplies are available at Buffalo. Bunker fuel and diesel fuel are delivered to vessels at their berths by tank vessels. Arrangements should be made through ships' agents. Occasionally tank trucks supply vessels with bunker fuel.

(198) **Repairs.**–There are no facilities for drydocking or hauling out large, deep-draft vessels. Two companies that have no waterfront facilities maintain shops and portable equipment for making above-the-waterline repairs and for installing equipment and machinery.

(199) **Small-craft facilities.–Erie Basin,** close N of the mouth of the Buffalo River, is the site of the city's marina. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pumpout facilities, marine supplies, a launching ramp, and minor engine repairs are available. In 1977, depths of 20 feet were reported in the entrance channel and alongside the berths, with 17 feet alongside the gasoline dock. The Buffalo **harbormaster** maintains an office in Erie Basin; telephone, 716–842–0452.

(200) The Niagara Frontier Transportation Authority operates a small-craft basin on the E side of Buffalo Outer Harbor about 2.3 miles SE of the mouth of Buffalo River. Transient berths, gasoline, water, ice, electricity, marine supplies, a launching ramp, a 22-ton mobile lift, and hull, engine, and electronic repairs are available. In 1977, depths of 7 feet were reported in the entrance with 3 to 14 feet alongside the berths.

(201) **Measured course.**–A measured mile, statute and nautical, is marked on the E face of the breakwater at the N end of the Outer Harbor.

(202) **Communications.**–Buffalo has excellent rail and highway connections with major United States and Canadian cities. Greater Buffalo International Airport is 8 miles ENE of the city.

(203) **Chart 14822.**–From **Stony Point** at the S end of Buffalo Harbor, the shoreline trends S for about 3.5 miles and is obstructed by shallow patches extending 1 mile offshore.

(204) A diked disposal area on the W side of Stony Point begins at South Buffalo Pierhead Light and curves SW to a point on shore about 0.5 mile S. The N end of the dike is marked by a light.

(205) S of the disposal area, a **dumping ground** extends about 0.5 mile from the shoreline for about 1 mile. A least depth of 6 feet was reported in 1977.

(206) About 3.5 miles S of Stony Point, the shoreline turns SW and continues this trend, with some southerly recessions and slight irregularities, for about 210 miles to a point about 3 miles E of Huron, Ohio, the southernmost point on the lake. The hydrography along this entire reach is generally of a uniform character, with no shoals, other than Seneca Shoal, at any great distance offshore, and the land varies from a low character to moderate bluffs of 60 to 120 feet high. The usual routes between ports are well out in deep water, and there are no natural obstacles which make navigation especially hazardous. From the bend S of Stony Point for the first stretch of 12 miles to Sturgeon Point, there are a number of submerged and exposed cribs as much as 0.6 mile offshore.

(207) **Seneca Shoal,** about 4.4 miles SW of Stony Point, has a least depth of 12 feet and is marked on its NW edge by a lighted buoy.

(208) **Chart 14823.**–Between **Sturgeon Point** (42°41.4′N., 79°02.9′W.) and **Silver Creek,** about 12 miles SW, the hydrography is less regular. W of **Big Sister Creek,** about 2 miles from Sturgeon Point, an unmarked boulder ledge with a least depth of 3 feet extends 2 miles offshore.

(209) **Cattaraugus Creek** is about 9.5 miles SW of Sturgeon Point. A dredged channel protected by breakwaters leads to a small turning basin on the N side of the channel just inside the breakwaters, thence to the first railroad bridge, about 0.6 mile above the mouth of the creek. The ends of the breakwaters are marked by lights. The channel inside the breakwaters is narrow and unmarked with numerous turns. Because of changing conditions, mariners are advised to seek local knowledge before transiting the creek. Several marinas in the creek provide transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, towing, and launching ramps. Mobile lifts to 20 tons are available for hull and minor engine repairs. In 1977, depths of 2 to 10 feet were reported alongside the berths.

(210) Between Cattaraugus Creek and Silver Creek, a stony ledge extends 1.5 miles from shore. From Silver Creek, the shoreline trends generally SW for 10 miles to Dunkirk, and shoal water extends about 0.8 mile offshore.

(211) **Dunkirk Harbor,** about 35 miles SW of Buffalo Harbor, is in an indentation of the shore between **Battery Point** on the E and **Point Gratiot** on the W. The harbor serves the town of **Dunkirk, N.Y.**

(212) An unmarked **dumping ground** with a least reported depth of 35 feet is 1 mile NE of Point Gratiot.

(213) **Dunkirk Light** (42°29.6′N., 79°21.2′W.), 82 feet above the water, is shown from a white square tower with an attached dwelling on Point Gratiot.

(214) **Channels.**–The harbor is entered from Lake Erie through a dredged entrance channel NE of Point Gratiot. The channel leads SE between a pier on the W and a detached breakwater on the E to the harbor basin off the Municipal Pier. The pier and breakwater are marked on the channel ends by lights, and the channel limits are marked by buoys. In April 1998, the controlling depths were 10 feet (14 feet at midchannel) from deep water in the lake to just inside the outer piers, thence 6 feet (7 feet at midchannel) to the Municipal Pier, except for lesser depths to 2½ feet in the E part of the channel.

(215) Inside the harbor, a breakwater is E and W of the N end of the Municipal Dock. A dredged channel extends S along the E and W sides of the Municipal Pier and along the S sides of the E and W breakwaters. The breakwaters are marked by lights. In April 1998, the controlling depths were 6 feet in the access channel along the E side of the Municipal Pier except for lesser depths to 3 feet along the S edge, thence 4 feet in the N half and 5½ feet in the S half with lesser depths to 2½ feet along the E edge of the channel just S of the E breakwater, thence 8 feet in the access channel along the W side of the Municipal Pier, thence 4½ feet in the channel S of the W breakwater.

(216) **Anchorages.**–Because of the rock bottom, anchorage in the harbor is poor. The shallow water does not permit mooring to the breakwater.

(217) **Dangers.**–Vessels entering the harbor should hold to the E to avoid the shoals along the SW side of the channel. As there is no breakwater protection on the E side, the harbor is subject to severe wave action from E storms.

(218) **Small-craft facilities.**–In 1977, the **harbormaster** reported that the Dunkirk Public Dock at the foot of Central Avenue was in an unsafe condition and was no longer being used by commercial vessels. Persons desiring to load or unload cargo at the dock should contact the harbormaster or the city engineer for additional information. The dock has water and electricity available for transient small craft. In 1977, depths of 5 to 8 feet were reported along the N end of the E face.

(219) Small-craft facilities SW of the city dock provide gasoline, diesel fuel, water, sewage pump-out, marine supplies, and a launching ramp. Mobile lifts to 1½ tons are available for emergency hull and minor engine repairs.

(220) Between Gratiot Point and **Van Buren Point** (42°27.2′N., 79°25.0′W.), 4.3 miles SW, a rocky bank with less than 20 feet of water extends 1 mile from shore. From Van Buren Point, the shoreline trends SW for about 12 miles to Barcelona Harbor. The shore is clear to within 0.7 mile except just W of Van Buren Point where depths to 19 feet extend 1.2 miles off.

(221) **Barcelona Harbor,** just E of the mouth of **Chautaugua Creek,** is about 17 miles SW of Dunkirk. Although it is not protected from E winds or strong winds from any direction, it is sometimes used as a harbor of refuge by light-draft vessels. A large white building with a red roof is prominent on the W side of the harbor entrance.

(222) **Channels.**–The harbor is entered from Lake Erie through a dredged entrance channel between two converging breakwaters to a harbor basin just inside. Lights mark the outer ends of the breakwaters. In September 1998, the controlling depth was 9 feet, except for much lesser depths to 5 feet on the W side between the lakeward ends of the converging breakwaters, thence 3 to 5 feet in the N central part of the basin, decreasing considerably toward the head and the sides.

(223) **Small-craft facilities.**–An unmarked channel leads from the harbor basin SE to the city dock. In 1977, depths of 4 feet were reported in the channel and along the N 200 feet of the W face of the dock. A marina on the SW side of the harbor provides transient berths, gasoline, diesel fuel, water, ice, electricity, and marine supplies. Mobile lifts to 9 tons are available for hull and gasoline engine repairs. In 1977, depths of 4 feet were reported alongside the berths.

(224) **Charts 14823, 14824, 14828.**–Erie Harbor is about 28 miles SW of Barcelona. The intermediate shore has no shoals beyond a distance of about 0.7 mile. The **State boundary** between New York and Pennsylvania is about 10 miles SW of Barcelona.

(225) **Charts 14824, 14828, 14835.**–**Presque Isle** (42°10.4′N., 80°04.8′W.) is an irregularly shaped peninsula forming nearly landlocked Erie Harbor. The peninsula is connected to the mainland by a narrow neck at the W end and broadens as it curves around to the NE and E. The entrance to Erie Harbor is on the S side of the E end of the peninsula. Presque Isle State Park is on the peninsula. **Presque Isle Light** (42°09.9′N., 80°06.9′W.), 73 feet above the water, is shown from a white square tower with an attached red dwelling on the NW shore of the peninsula. Numerous shore protection structures extend lakeward from the lakeside of the peninsula. Small-craft operators are cautioned to keep 500 feet offshore in the vicinity of these structures.

(226) **Erie Harbor,** about 78 miles SW of Buffalo, is in **Presque Isle Bay,** enclosed from the lake by Presque Isle. The bay opens to the E and is about 4.5 miles long and 1.5 miles wide. Erie Harbor, serving the city of **Erie, Pa.,** is in the SE part of the bay.

(227) Principal commerce at the port is in limestone, sand, salt, petroleum products, coke, steel products, pig iron, other alloys, gravel, clay, and general cargo in the domestic trade.

(228) **Prominent features.**–The stacks at the paper plant 1 mile SE of Erie Harbor Pierhead Light and the lighted stack 2.2 miles ESE of the light are prominent.

(229) **Erie Harbor Pierhead Light** (42°09.4′N., 80°04.3′W.), 42 feet above the water, is shown from a black and white horizontally banded square tower on the outer end of the N entrance pier. A fog signal is at the light.

(230) **Channels.**–A Federal project provides for a dredged entrance channel leading SW from deep water in Lake Erie between two parallel piers to a harbor basin and three adjacent turning basins in Presque Isle Bay. The N pier is marked by a light at its outer end, and the S pier by two lights near its midlength which form a **235°** range. The channel limits are marked by lighted and unlighted buoys. Two lights near the inner end of the N pier form a **054°30′** range. The Federal project depths are 29 feet in the entrance channel, 28 feet in Harbor Basin, 27 feet in Approach Turning Basin, 21 feet in Erie Turning Basin, and 18 feet in Harbor Turning Basin. (See Notice to Mariners and latest edition of charts for controlling depths.)

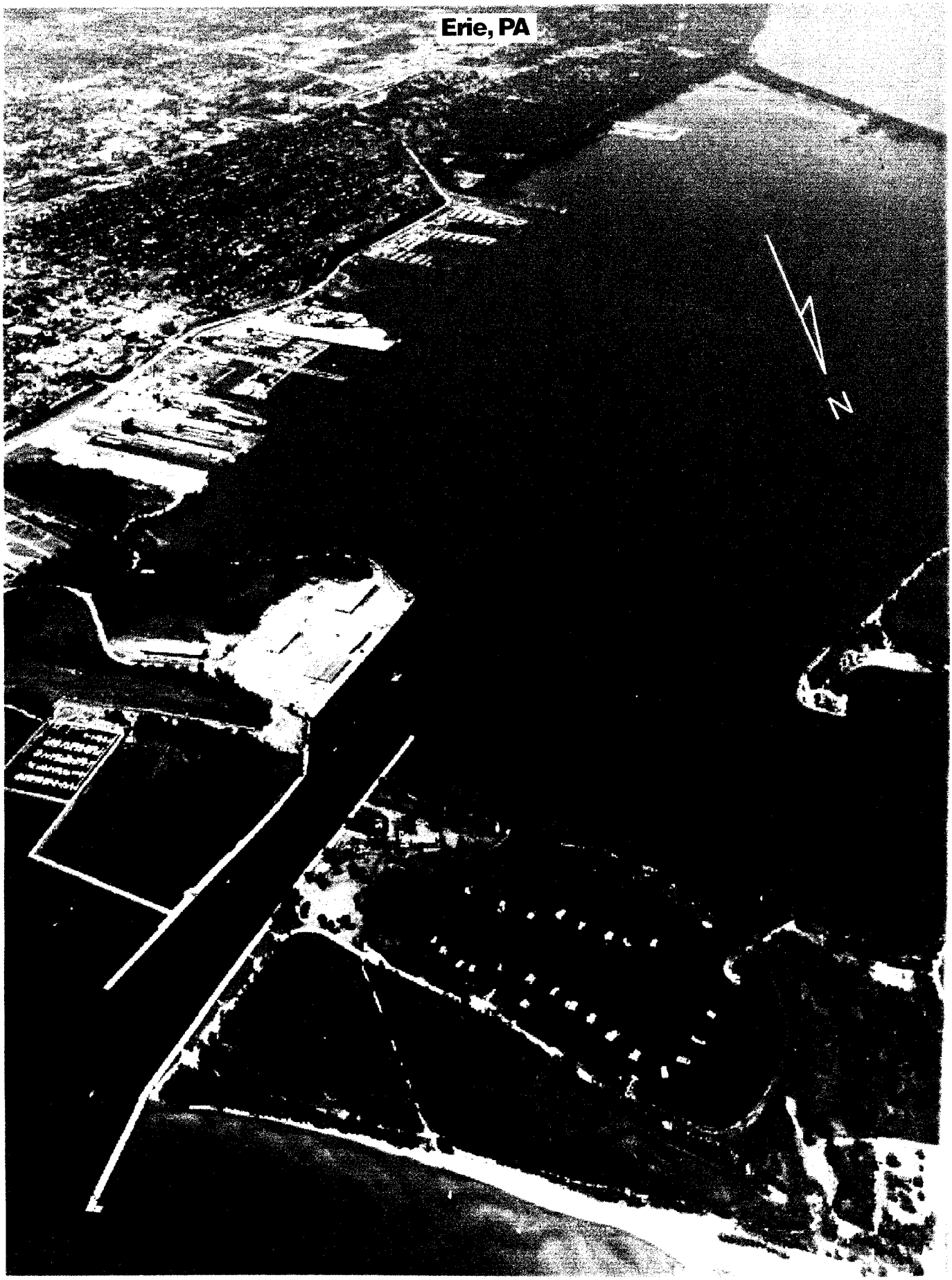
(231) An approach channel marked by buoys leads SW from the harbor basin to a turning basin off the piers on the S side of the bay about 2.6 miles SW of Erie Harbor Pierhead Light. The channel and turning basin are not maintained.

(232) **Misery Bay** is an indentation in the S side of Presque Isle N of Erie Harbor Entrance Channel. The bay has depths of 5 to 10 feet except for shoaling along the edges. A rock which bares is on the E side of the bay on the S side of the channel leading to **Horse Shoe Pond.**

(233) **Anchorages.**–Good anchorage is in the center of Presque Isle Bay in depths of 12 to 22 feet, mud bottom. Local regulations prohibit vessels from anchoring in any channel or mooring to channel markers and buoys. Vessels over 100 feet long or over 50 tons are prohibited from anchoring within 500 feet of the city water intake or sewer pipelines. The city water intake extends NW across Presque Isle Bay and is marked by buoys.

(234) **Dangers.**–An unmarked submerged pier, covered 1 to 2 feet, extends about 2,000 feet from shore 0.8 mile SSE of Erie Harbor Pierhead Light.

(235) **Weather, Erie and vicinity.**–Erie, PA, located on the southeast shore of Lake Erie and in extreme northwestern Pennsylvania, averages about three days each year with maximum tem-


Erie, PA
N

peratures in excess of 90°F (32.2°C). July is the warmest month with an average high of 79°F (26.1°C) and an average minimum of 62°F (16.7°C). January is the coolest month with an average high of 33°F (0.6°C) and an average minimum of 20°F (-6.7°C). The highest temperature on record for Buffalo is 100°F (37.8°C) recorded in June 1988 and the lowest temperature on record is -18°F (-27.8°C) recorded in January 1994. About 124 days each year sees temperatures below 32°F (0°C) and an average nine days each year records temperatures below 5°F (-15°C). Every month has seen temperatures below 50°F (10°C) and every month except July, August, and September has recorded temperatures at or below freezing (0°C).

(236) The average annual precipitation for Erie is 40.5 inches (1029 mm) which is fairly evenly distributed throughout the year. Precipitation falls on about 223 days each year. The wettest month is September with 4.1 inches (104 mm) and the driest, February, averages only 2.3 inches (58 mm). An average of 36 thunderstorm days occur each year with July and August being the most likely months. Snow falls on about 91 days each year and averages about 83 inches (2108 mm) each year. December and January each average greater than 20 inches (508 mm) per year while February averages 16 inches (406 mm). One foot or greater (>305 mm) snowfalls in a 24-hour period have occurred in each month November through March and 23 inches (584 mm) fell in one 24-hour period during November 1956. About 17 days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June, July, August, and September. Fog is present on average 140 days each year and is evenly distributed throughout the year with a slight maximum in March.

(237) The prevailing wind direction in Erie is south from May through November, south-southwest in December and January, and west-southwest from February through April. The winter season is the windiest with each month, December through April, averaging 12 knots. The highest gust on record was a west wind of 68 knots recorded in January 1978.

(238) (See page T-4 for **Erie climatological table.**)

(239) **Towage.**–Tugs for Erie are available from Conneaut or Cleveland. (See Towage under Conneaut and Cleveland.)

(240) Erie is a **customs port of entry.**

(241) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(242) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(243) **Coast Guard.**–Erie Coast Guard Station is on the N side of the entrance channel.

(244) **Harbor Regulations** are established by the Erie-Western Pennsylvania Port Authority and enforced by the **harbormaster.** A **speed limit** of 3 mph (2.6 knots) is enforced in the East and West Canal Basins and within 300 feet of the shoreline, and 5 mph (4.4 knots) elsewhere in the harbor. Copies of the regulations may be obtained from the Port Authority Office, 17 W. Dobins Landing, Erie, PA 16501, telephone (814) 455-7557.

(245) **Wharves.**–The piers and wharves of Erie Harbor are along the S side of Presque Isle Bay. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have highway and rail connections. Water and electrical shore-power connections are available at some of the piers and wharves.

(246) General cargo at the port is usually handled by ship's tackle; special handling equipment, if available, is mentioned in the description of the particular facility. Cranes to 300 tons are available at the Erie International Marine Terminal.

(247) **Erie International Marine Terminal, Berths No. 1, 2, and 3:** S side of entrance channel at inner end of S pier; 1,450 feet of berthing space; 23 to 26 feet alongside; deck height, 8½ feet; 95,300 square feet covered storage; 22 acres open storage; 300-ton fixed crane; two 110-, two 200-, and one 230-ton crawler cranes; receipt and shipment of general and containerized cargo, dry bulk commodities, vehicles, steel products, and lumber; owned by Port Authority, Erie-Western Pennsylvania and operated by Codan Corp.

(248) **Erie Dry Bulk Wharf:** (42°08′25′N., 80°05′00″W.); 1,220-foot face; 24 to 22 feet alongside; deck height, 7½ feet; about 5.5 acres open storage; use of cranes from Erie Sand and Gravel Company Dock; receipt of salt and sand; owned by Port Authority, Erie-Western Pennsylvania and operated by Erie Sand and Gravel Co.

(249) **Erie Sand and Gravel Company Dock:** (42°08′13″N., 80°05′38″W.); 305-foot N face, 19 to 21 feet alongside; 1,031-foot E face, 21 to 14 feet alongside; deck height, 6 feet; open storage for about 100,000 tons of material; two crawler cranes, one 30-ton mobile crane, and three 5-cubic yard front-end loaders; receipt of sand and limestone; owned and operated by Erie Sand and Gravel Co.

(250) **Supplies.**–By special arrangement, local dealers make tank truck deliveries of bunker fuel to vessels at the berths. Diesel fuel, marine supplies, and provisions are available at Erie.

(251) **Repairs.**–The port has no active drydock or major repair facilities for deep-draft vessels. The nearest such facilities are at Lorain, Ohio. Erie Marine Enterprises maintains a pier and graving dock in the SE part of the harbor for vessel outfitting, conversion, and occasional repairs. The pier is 1,115 feet long with 12 to 28 feet alongside. The graving dock is 1,250 feet long, 120 feet wide at the entrance, and has a depth of 21 feet over the sill. Mobile cranes to 125 tons and yard shops are available.

(252) **Small-craft facilities.**–Numerous marinas and boatyards in **Canal Basin** on the S side of Erie Harbor provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and marine supplies. Mobile lifts to 30 tons, fixed lifts to 60 tons, and marine railways to 100 tons are available for hull, engine, and electronic repairs. In 1990, depths of 3 to 12 feet were alongside the gasoline docks.

(253) Presque Isle State Park Marina is in a dredged basin on the NW side of Presque Isle Bay. The entrance to the basin is marked by private lights and a **339°45′** lighted range. In 1977, the reported controlling depths were 9 feet on the centerline in the entrance, 8 feet in the basin except for an isolated 6-foot spot in the E part, and 8 feet alongside the berths. Gasoline and a launching ramp are available. Mobile lifts to 10 tons are available for emergency propellor and minor repairs.

(254) A municipal marina, protected by breakwaters, is S of the Erie Harbor entrance channel. The marina entrance is marked by private lights.

(255) **Communications.**–Erie is connected by air, rail, and highway to other major United States and Canadian cities. Passenger ferries operate between the city of Erie and the SE side of Presque Isle.

(256) **Charts 14824, 14828.**–From the neck of Presque Isle, the shoreline extends about 23 miles SW to Conneaut Harbor. The shore in this stretch has the appearance of low wooded hills with interspersed communities. Deep water is about 0.8 mile offshore.

(257) The **State boundary** between Pennsylvania and Ohio is about 1.5 miles E of Conneaut.

(258) **Conneaut Harbor,** serving **Conneaut, Ohio,** is about 107 miles SW of Buffalo and about 73 miles NE of Cleveland. It comprises an outer harbor sheltered by breakwaters and an inner harbor in the lower part of the **Conneaut River.**

(259) A large unmarked **dumping ground** with a least depth of 41 feet in 1976 is 5 miles NW of the harbor entrance.

(260) **Prominent features.**–Green water tanks 1.7 and 2.8 miles SSW of the harbor are prominent.

(261) **Conneaut Harbor West Breakwater Light** (41°58.8′N., 80°33.4′W.), 80 feet above the water, is shown from a square white pyramidal tower with a black band on the outer end of the W breakwater. A fog signal is at the light.

(262) **Channels.**–The harbor is entered from natural deep water in Lake Erie between converging breakwaters to a dredged basin inside the breakwaters. A dredged channel leads from the SE corner of the basin upstream in Conneaut River for about 0.4 mile to the wharves on either side of the river. Lights mark the outer ends of the breakwaters and the piers at the river mouth. In May 1998, the controlling depths were 18 feet (20 feet at midchannel) in the basin, thence 24 feet at midchannel in the dredged river channel.

(263) A privately dredged turning basin in the river immediately above the limit of the dredged channel had a controlling depth of 20 feet in 1979 except for shoaling along the edges. A private slip extending S from the turning basin has a least depth of 17 feet near the S end.

(264) **Anchorages.**–Vessels are reported to anchor W of the W breakwater in 28 to 38 feet, but the holding ground is poor in shale bottom.

(265) **Dangers.**–Vessels approaching the harbor from the E are cautioned to not mistake the lights on the piers at the river mouth for the breakwater lights. Use of the gap in the W breakwater should be strictly avoided, because of a large shoal area in the outer harbor W of the municipal pier.

(266) In December 1978, a large anchor was reported lost in the E part of the outer harbor in about 41°58′33.3″N., 80°33′03.8″W.

(267) **Bridges.**–An overhead cable crossing the SE side of the privately dredged turning basin in the river has a clearance of 124 feet. An inoperative swing bridge with a clearance of 3 feet crosses the Conneaut River just above this cable. An overhead cable with a clearance of 122 feet crosses the entrance to the slip that extends S from the privately dredged turning basin.

(268) **Towage.**–Tugs to 1,250 hp are available in Conneaut Harbor. Arrangements for tugs are made through the Great Lakes Towing Co. dispatcher in Cleveland at 800-621-4330 or on VHF-FM channels 16, 10, 12, and 18A via remote antenna. The tugs' VHF-FM channels include 16, 6, 12, 14, and 18A. At least 2 hours advance notice is requested.

(269) Ashtabula/Conneaut is a **customs port of entry.**

(270) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(271) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(272) **Harbor regulations.**–A **speed limit** of 6 mph (5.2 knots) is enforced in the harbor except in the outer harbor where the speed limit is 10 mph (8.7 knots). (See **33 CFR 162.160 and 207.570,** chapter 2, for regulations.)

(273) **Wharves.**–The deep-draft facilities at Conneaut Harbor are in the inner harbor inside the mouth of the Conneaut River. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have rail connections and all but the Pittsburgh and Conneaut Dock Co., Dock No. 4, have highway connections. All the described facilities have water and electrical shore-power connections.

(274) **Pittsburgh and Conneaut Dock Co., Dock No. 1 Extension:** (41°58′12″N., 80°32′58″W.); 1,974-foot face; 27 to 22 feet alongside; deck height, 8½ feet; open storage for 600,000 tons of limestone; three crawler cranes; two front-end loaders; receipt of limestone; owned by Bessemer and Lake Erie Railroad Co. and operated by United States Steel Corp., Eastern Limestone Operation.

(275) **Pittsburgh and Conneaut Dock Co., Dock No. 3:** E side of slip S of the turning basin; 1,250-foot face; 27 to 28 feet alongside; deck height, 8½ feet; one fixed coal loading tower, capacity 7,000 tons per hour; one slewing coal loader, capacity 4,000 tons per hour; conveyor system for 3½-million-ton open storage area; shipment of coal; occasional bunkering of vessels; owned by Bessemer and Lake Erie Railroad Co. and operated by Pittsburgh and Conneaut Dock Co.

(276) **Pittsburgh and Conneaut Dock Co., Dock No. 4:** E side of river opposite Dock No. 1 extension; 2,078 feet of berthing space; 27 to 28 feet alongside; deck height, 8½ feet; five 17-ton hulett-type ore unloaders, capacity 875 tons per hour each; open storage for 3½ million tons of ore; receipt of iron ore and limestone; owned and operated by Pittsburgh and Conneaut Dock Co.

(277) **Supplies.**–Diesel oil by tank truck and some marine supplies and provisions are available at Conneaut.

(278) **Small-craft facilities.**–A dredged channel extends S from the outer basin to the Municipal Pier 0.4 mile SW of the river mouth. In May 1979, the controlling depths were 3 feet at midchannel, with 3 feet along the N pier face, and thence in 1977, 2 to 7 feet reported along the W face. Gasoline, diesel fuel, and electricity are available.

(279) The Conneaut Port Authority operates a small-craft basin NE of the Municipal Pier. The entrance to the basin is marked by private lights. In 1977, the reported controlling depth was 5 feet in the entrance with 3 to 18 feet alongside the berths. Transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, and launching ramps are available.

(280) **Communications.**–Conneaut has good highway and rail connections.

(281) **Charts 14824, 14828, 14825.**–From Conneaut to Ashtabula, 13.5 miles SW, there is deep water about 0.8 mile offshore. The shore is a series of low wooded hills with interspersed communities.

(282) Two wrecks, covered 35 feet, are 1.5 miles offshore about 3.9 miles ENE of the entrance to Ashtabula Harbor.

(283) **Charts 14825, 14828, 14836.**–**Ashtabula Harbor** is about 119 miles SW of Buffalo and about 59 miles NE of Cleveland. It comprises an outer harbor, the navigable portion of the **Ashtabula River** for about 2 miles above the mouth, and two

Ashtabula, OH

large slips opening directly into the lake under the protection of the breakwaters.

(284) The major commodities handled at the port are limestone, iron and other ores, coal and other dry bulk commodities, pig iron, iron products, raw rubber, and general cargo in the domestic trade.

(285) Two unmarked **dumping grounds,** with least reported depths of 35 feet, are 2.4 miles N and 2 miles NE of the harbor entrance.

(286) **Prominent features.**–The lighted stacks 1.5 miles SE and 1.8 miles ESE of the harbor entrance are conspicuous. The silos on the W side of the river mouth are also prominent.

(287) **Ashtabula Harbor Light** (41°55.1′N., 80°47.8′W.), 51 feet above the water, is shown from a white cylindrical tower on a white square house near the outer end of W breakwater.

(288) **Channels.**–The harbor is entered from Lake Erie through a dredged entrance channel between converging breakwaters that are marked at the outer ends by lights. Inside the breakwaters, the outer harbor divides into E and W channels with a central turning basin. The limits of the dredged areas in the outer harbor are marked by buoys. The W channel leads along the W breakwater and around the W end of an inner detached breakwater to the mouth of the ConRail Minnesota Slip and to the mouth of the Ashtabula River and thence upstream for about 2 miles; a turning basin is 0.3 mile below the head of the project. A light marks the W end of the inner detached breakwater. The E channel leads SE to a basin off the entrance to two large slips. A triangular turning basin is between the two outer channels on the N side of the inner detached breakwater.

(289) In June 1998, the midchannel controlling depth in the W channel of the outer basin was 24 feet to the mouth of the river, thence 24 feet at midchannel to the mouth of Pinney Minnesota slip, thence 20 feet (except for lesser depths along the W side at the mouth) in the river to a point about 2,000 feet above the mouth, thence 5½ feet (10 feet at midchannel) to Ashtabula Yacht Club, shoaling to nearly bare near the center of the entrance to the Yacht Club, thence about 2 feet to the basin S of the bascule bridge (with local knowledge deeper water could be carried) thence in 1996, 1½ to 3 feet were in the basin, thence in June 1998, 2 feet to the head of the project. In June 1998, the controlling depth in the E channel of the outer basin was 21 feet (25 feet at midchannel) to the easternmost deep slip, thence about 18 feet in the remainder of the basin except for lesser depths near the E edge. The controlling depth in the triangular turning basin in the outer harbor N of the detached breakwater was 17 feet except for shoaling to 11 to 16 feet along the E edge.

(290) **Anchorages.**–Deep-draft vessels normally anchor about 2 miles ENE or W of the breakwater entrance in 35 to 45 feet, sand and mud bottom.

(291) **Bridges.**–An overhead conveyor with a clearance of 100 feet crosses the Ashtabula River about 0.5 mile above the mouth. An overhead power cable with a clearance of 120 feet is about 0.1 mile N of the overhead conveyor. The Fifth Street bridge about 0.15 mile upstream from the conveyor has a bascule span with a clearance of 11 feet. The ConRail bridge about 1.5 miles above the river mouth has a bascule span with a clearance of 11 feet. An overhead cable on the N side of the bridge has a clearance of 131 feet. (See **33 CFR 117.1 through 117.59 and 117.847**, chapter 2, for drawbridge regulations.)

(292) **Local bridge regulations.**–

(293) 147.35 Bridges to be Lighted.

(294) All bridges over the Ashtabula River in the City of Ashtabula shall be lighted in accordance with the regulations of the United States Coast Guard, and lights shall be visible on a dark night with clear atmosphere at least one (1) nautical mile or about 2,000 yards.

(295) 147.36 Vessels Passing through Bridges.

(296) All vessels navigating the harbor when passing any bridge shall be moved as expeditiously as is consistent with a proper movement in the river, and shall not be anchored or fastened to interfere with the opening or closing of any bridge.

(297) 147.37 One Vessel Tow.

(298) It shall be unlawful for any person to cause any vessel to tow more than one vessel at a time through any movable bridge in the harbor, providing that this shall not be construed as applying to scows or yachts.

(299) 147.41 Duty of Bridge Operators.

(300) It shall be the duty of the bridge operator in all cases to report to his immediate superior and the Harbor Master any infraction of this article.

(301) 147.42 Penalty for Violation.

(302) Any master, owner or person in possession, charge or control of any vessel, or any other person, firm or corporation who shall violate any of the provisions of this article shall be fined not less than fifty dollars ($50.00) nor more than five hundred dollars ($500.00).

(303) **Towage.**–Tugs to 1,400 hp are available at Ashtabula. Arrangements for tugs are made through the Great Lakes Towing Co. dispatcher in Cleveland at 800-621-4330 or on VHF-FM channels 16, 10, 12, and 18A via remote antenna. The tugs' VHF-FM channels include 16, 6, 12, 14, and 18A. At least 2 hours advance notice is requested.

(304) Ashtabula/Conneaut is a **customs port of entry.**

(305) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(306) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(307) **Coast Guard.**–Ashtabula Coast Guard Station is on the E side of the Ashtabula River about 0.5 mile above the mouth.

(308) **Harbor regulations.**–A **speed limit** of 6 mph is enforced in the harbor except in the outer harbor where the speed limit is 10 mph (8.7 knots). (See **33 CFR 162.160 and 207.570,** chapter 2, for regulations.)

(309) Local harbor regulations are established by the City Council and enforced by the **harbormaster** who may be reached at the Port Authority Office. The harbormaster controls vessel movement and berthage in the harbor. Local regulations specify a **speed limit** of 6 mph (5.2 knots) in the harbor for vessels over 100 feet long. Copies of the regulations may be obtained from Port Authority Office, 529 Prospect Road, Ashtabula, Ohio 44004.

(310) **Wharves.**–The wharves of Ashtabula Harbor are on the S side of the outer harbor and along both sides of the Ashtabula River. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have highway connections, and all except the R. W. Sidley Wharf have railway connections. Water and electrical shore-power connections are available at most of the facilities.

(311) **Facilities in the Ashtabula River:**

(312) **Consolidated Rail Corp., Coal Dock No. 10:** W side of the river inside the mouth; 2,800-foot face; 27 to 14 feet alongside; deck height, 7 feet; one traveling coal loader, capacity 8,000

tons per hour; open storage for 1½ million tons of coal; shipment of coal; owned by ConRail and operated by the Lower Lake Dock Co.

(313) **R. W. Sidley Wharf:** E side of the river 0.6 mile above the mouth; about 350 feet of berthing space; 15 to 17 feet alongside; one crawler crane; one mobile front-end loader; open storage for 60,000 tons of limestone; receipt of limestone; owned and operated by R. W. Sidley, Inc.

(314) **Facilities in the outer harbor:**

(315) **Consolidated Rail Corp., Dock No. 1 Extension:** S side of outer harbor between river mouth and ConRail Minnesota Slip, and outer end of W side of ConRail Minnesota Slip; 1,030-foot N face, 25 to 17 feet alongside; 1,165-foot E face, 27 feet alongside; deck height, 7 feet; four hulett-type ore unloaders; open storage for 1 million tons of iron ore; receipt of iron ore; owned by ConRail and operated by Ashtabula and Buffalo Dock Co.

(316) **Consolidated Rail Corp., Dock No. 2 Extension:** Outer end of E side of ConRail Minnesota Slip; 1,198-foot face; 27 feet alongside; deck height, 7 feet; one front-end loader; open storage for 1 million tons of iron ore; receipt of iron ore; owned by ConRail and operated by Ashtabula and Buffalo Dock Co.

(317) **Pinney Dock No. 1:** W side of Slip No. 1, about 0.5 mile E of the river mouth; 2,000-foot face; 28 to 30 feet alongside; deck height, 8 feet; 10 mobile front-end loaders; open storage for about 2 million tons in rear of Docks 1, 2, and 3; receipt of sand, quartz, limestone, and manganese ore; owned and operated by Pinney Dock and Transport Co., Inc.

(318) **Pinney Dock Nos. 2 and 3:** E side of Slip No. 1 and W side of Slip No. 2, about 0.6 mile E of the river mouth; Dock No. 2, 2,000-foot face, 28 to 30 feet alongside; Dock No. 3, 2,000-foot face, 27 feet alongside; deck height, 8 feet; use of mobile equipment from Dock No. 1; receipt of sand, quartz, limestone, and manganese ore; owned and operated by Pinney Dock and Transport Co., Inc.

(319) **Pinney Dock No. 4:** E side of Slip No. 2: 2,000-foot face; 27 feet alongside; deck height, 7 feet; two 45-ton gantry cranes; use of mobile equipment from Dock No. 1; 131,000 square feet covered storage; about 5 acres open storage; receipt and shipment of general cargo, receipt of raw titanium ore, china clay, pig iron, newsprint, lumber, raw rubber, and scrap metal; owned and operated by Pinney Dock and Transport Co., Inc.

(320) **Supplies.**–Diesel oil by tank truck and limited marine supplies and provisions are available at Ashtabula.

(321) **Repairs.**–Three companies in Ashtabula make above-the-waterline repairs and install equipment and machinery for vessels at berth in the harbor.

(322) **Small-craft facilities.**–Several marinas on the Ashtabula River provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. Mobile lifts to 40 tons are available for hull, engine, and electronic repairs. In 1977, depths of 8 to 16 feet were reported alongside the berths.

(323) **Communications.**–Ashtabula is served by ConRail and Norfolk Southern Railway, and has good highway connections.

(324) **Charts 14825, 14828, 14829.**–From Ashtabula SW for 27 miles to Fairport, the shore continues as a series of low wooded hills and small communities. Deep water is about 1 mile offshore. A sunken wreck, covered 10 feet, is about 0.6 mile offshore about 15 miles SW of Ashtabula. A boulder, covered 15 feet, is about 3 miles ENE of the entrance to Fairport Harbor.

(325) **Charts 14825, 14829, 14837.–Fairport Harbor** is about 29 miles NE of Cleveland Harbor. It comprises an outer harbor, and an inner harbor formed by the lower 1 mile of the **Grand River.**

(326) An unmarked **dumping ground** with a least reported depth of 35 feet is 3.5 miles NNE of the harbor entrance.

(327) **Prominent features.**–The stacks and tanks of a chemical plant 1.3 miles SE of the harbor entrance are very prominent from offshore.

(328) **Fairport Harbor West Breakwater Light** (41°46.1′N., 81°16.9′W.), 56 feet above the water, is shown from a white square tower on the corner of a square building about 500 feet from the outer end of the W breakwater. A fog signal is at the light.

(329) **Channels.**–The harbor is entered from Lake Erie through a dredged channel from deep water in the lake between two converging breakwaters to an outer harbor basin. From its inner end, the E breakwater turns E and parallels the shore for about 1 mile. Lights mark the outer ends of the breakwaters and the E end of the E breakwater. From the outer harbor basin, the mouth of the river is entered between parallel piers, marked at the outer ends by lights, and the channel extends upstream for 1.5 miles. There is a turning basin on the W side of the channel about 1 mile above the mouth. The areas on the E and W sides of the entrance channel in the outer basin are not maintained.

(330) In May 1998, the controlling depths were 23 feet at midchannel, in the entrance channel and outer basin channel to the piers, thence 20 feet at midchannel to the turning basin with 14 to 18 feet in the basin with lesser depths near the edges, thence 4 feet (7½ feet at midchannel) to the upstream limit of the project. The areas E and W of the channel limits, within the outer basin limits, have general depths of 9 to 20 feet.

(331) **Dangers.**–A wreck, covered 30 feet, is about 0.6 mile NW of the breakwater entrance. In June 1986, a sunken wreck was reported in the harbor approach in 41°46.3′N., 81°16.9′W. A shoal that extends NW from the N end of the W breakwater tends to encroach the W side of the approach channel. Deep-draft vessels should avoid favoring the W channel limit when entering or leaving the harbor. At times a very strong current past the river mouth pierheads makes it difficult and dangerous for unaided vessels to enter the river channel.

(332) A wreck, covered 6 feet, is in the outer harbor basin about 1,000 feet E of East Pier Light in about 41°45′41″N., 81°16′35″W.

(333) Mariners are cautioned to avoid dragging anchor over the submerged pipeline just above the river mouth. The harbormaster reports that vessels sometimes scrape the pipeline during low water conditions.

(334) The E end of the E breakwater may become submerged during certain weather conditions. The center pier abutment of a former railroad swing bridge, about 1.72 miles above the river entrance, has been removed to about 4 feet below water level; mariners are advised to use extreme caution when transiting the area.

(335) **Towage.**–Tugs for Fairport Harbor are available from Ashtabula or Cleveland. (See Towage under Ashtabula and Cleveland.)

(336) Fairport Harbor is a **customs station.**

(337) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(338) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

## Structures Across Grand River at Fairport
### *Miles above West Breakwater Light
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 1 | Overhead cable | Power | 1.32 | | | | 120 | |
| 2 | Overhead cables | Power | 2.50 | | | | 15 | Note 1. |
| 3 | CSX RR bridge | Railroad | 2.73 | | | 72 | 20 | Fixed. |
| 4 | Overhead cable | Power | 2.74 | | | | 40 | |
| 5 | High St. bridge | Highway | 2.76 | 115 | 115 | | 10 | Fixed. |
| 6 | Overhead cable | | 2.77 | | | | 23 | |
| 7 | St. Clair St. bridge | Highway | 3.24 | | | 90 | 15 | Fixed. |

Note 1.–Cables cross the river from the N bank to an island at midstream.

(339) **Coast Guard.**–Fairport Harbor Coast Guard Station is on the W side of the river just inside the mouth.

(340) **Harbor Regulations** are enforced by the **harbormaster** who may be reached through the Chief of Police, 220 3rd Street, Fairport Harbor, Ohio 44077. **Speed limits** of 6 mph (5.2 knots) and 10 mph (8.7 knots) are enforced in Grand River and in the outer harbor, respectively. (See **33 CFR 162.160 and 207.570,** chapter 2, for regulations.) Copies of the local regulations may be obtained from Village Hall, 220 3rd Street, Fairport Harbor, Ohio 44077.

(341) **Wharves.**–Fairport Harbor has numerous wharves and docks in Grand River. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have highway connections and many have railway connections. Some of the facilities have water available.

(342) **Union Sand and Supply Corp. Dock:** E side of river 0.25 mile above pierheads; 1,119-foot face; 23 to 15 feet alongside; deck height, 10 feet; one front-end loader; open storage for 100,000 tons of material; receipt of sand and limestone; owned by Fairport Development Co., Inc., and operated by the Union Sand and Supply Corp.

(343) **Northeastern Road Improvement Co. Dock:** E side of river above Union Sand and Supply Corp. Dock; 1,000-foot face; 23 to 15 feet alongside; deck height, 10 feet; one front-end loader; open storage for 200,000 tons of limestone; receipt of limestone; owned and operated by the Northeastern Road Improvement Co.

(344) **Standard Machine and Equipment Co. Wharf:** E side of river 1.2 miles above pierheads; 1,300 feet of berthing space; 23 to 20 feet alongside; deck height, 8 feet; two front-end loaders; 18-ton traveling bridge crane; open storage for 600,000 tons of limestone; owned by The Ceico Co. and operated by Standard Machine and Equipment Co.

(345) **Painesville Grand River Dock Co. Dock:** W side of the river 0.3 mile above the pierheads; 1,540 feet berthing space along natural bank; 22 to 18 feet alongside; deck height, 4 to 5 feet; one crawler crane and three front-end loaders; open storage for 100,000 tons of material; receipt of limestone and sand; owned by A. J. Ronyak, Inc., and R. W. Sidley, Inc., and operated by Painesville Grand River Dock Co.

(346) **Morton Salt Co. Fairport Plant Dock:** W side of the river 0.5 mile above the pierheads; 600 feet of berthing space with dolphins; 24 to 20 feet alongside; deck height, 10 feet; one fixed, offshore loading tower, capacity 1,000 tons per hour; storage silos for 12,000 tons of salt; open storage for 250,000 tons of salt; shipment of bulk salt; owned and operated by Morton Salt Co.

(347) **LTV Steel Co., Lime Plant Dock:** W side of the river 0.75 mile above the pierheads; about 1,700 feet of berthing space along natural bank; 24 feet alongside; deck height, 3½ to 4 feet; two front-end loaders; storage silos for 17,000 tons of lime; open storage for 400,000 tons; receipt of limestone; owned and operated by LTV Steel Co.

(348) **Osborne Concrete and Stone Co. Dock:** On N and W sides of turning basin 1 mile above the pierheads; 400 feet of berthing space along natural bank on N side of basin, 19 to 18 feet alongside; 650 feet of berthing space along natural bank on W side of basin, 19 to 18 feet alongside; deck height, 4 feet; three front-end loaders and one mobile crane; open storage for 100,000 tons of material; receipt of limestone and sand; owned and operated by Osborne Concrete and Stone Co.

(349) **Supplies.**–Bunker fuel is available by tank vessel from Cleveland. Limited marine supplies and provisions are available at Fairport Harbor.

(350) **Small-craft facilities.**–Several marinas on the Grand River provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Mobile lifts to 18 tons are available for hull, engine, and electronic repairs. In 1977, depths of 2 to 7 feet were reported alongside the berths.

(351) **Communications.**–Fairport Harbor has good highway connections and is served by CSX Transportation, Inc.

(352) **Charts 14825, 14826, 14829.**–From Fairport Harbor, the shoreline trends SW for about 29 miles to the main entrance to Cleveland Harbor. There is deep water about 1 mile offshore at Fairport Harbor, decreasing to 0.5 mile or less offshore at Cleve-

land. Several small-craft harbors and marinas are along this stretch of low wooded hills.

(353) **Charts 14825, 14829.–Mentor Harbor,** about 4.5 miles SW of Fairport Harbor, comprises a group of privately developed small-craft channels and basins. The entrance to the harbor, protected by parallel breakwaters, is marked by private lights on the outer and inner ends of the breakwaters; a private **142°** range marks the approach. Local yachting interests usually maintain the entrance channel, close to the E breakwater. After strong NW to NE winds, sandbars are reported to form in the entrance channel. In May 1985, depths of 10 feet were reported in the entrance channel with, in 1979, 4 feet alongside the berths in the harbor. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, and marine supplies are available. Mobile lifts to 25 tons are available for hull, engine, and electronic repairs.

(354) A wreck, covered 20 feet, is 1.5 miles WNW of the entrance to Mentor Harbor.

(355) **Chagrin River** is about 10 miles SW of Fairport Harbor. The entrance is marked by a private light on the E side and by private lights on the pier on the W side of the mouth. In 1979, the controlling depth in the river was 1 foot, except for shoaling to bare on the E side about 200 feet inside the entrance. Several marinas in the river provide transient berths, water, electricity, sewage pump-out, marine supplies, and launching ramps. Mobile lifts to 30 tons are available for hull, engine, and electronic repairs. In 1999, depths of about 8 feet were reported in the lagoon on the W side of the river just inside the entrance.

(356) The intake channel of a powerplant is just W of the mouth of Chagrin River. A private light marks the outermost part of the breakwaters that protect the channel.

(357) **Charts 14826, 14829.**–The Wildwood Yacht Club harbor is about 5.4 miles NE of Cleveland Harbor East Entrance Light, close NE of **Euclid Creek.** The entrance is marked by private lights on the ends of the E and W pierheads. A detached breakwater is marked by private lights. In 1977, the reported controlling depths were 7 feet in the entrance, and 7 to 11 feet in the harbor.

(358) The Northeast Yacht Club Basin is adjacent to the Cleveland sewage disposal plant, about 4 miles NE of Cleveland Harbor East Entrance Light. The entrance is marked by private lights on the E end of the N breakwater and the N end of the E breakwater. In 1977, the reported controlling depth was 6 feet in the entrance and in the basin.

(359) In July 1984, a dangerous submerged wreck was reported about 2 miles NW of the mouth of Euclid Creek in about 41°36′N., 81°36′W.

(360) About 3.1 miles SW of Euclid Creek, at the mouth of a stream known locally as **Dugway Brook,** are submerged pilings in 12 feet of water.

(361) **Charts 14826, 14829, 14839.–Cleveland Harbor,** about 175 miles SW of Buffalo and 95 miles E of Toledo, consists of an outer harbor formed by breakwaters and an inner harbor made up of the **Cuyahoga River,** and the **Old River** which was the original outflow channel of the Cuyahoga River. The city of **Cleveland, Ohio,** is one of the major industrial centers on Lake Erie.

(362) The major commodities handled at the port are iron, steel, and aluminum products; limestone, iron ore, sand, stone, salt, and other minerals; petroleum products and other liquid bulk cargo; and general and containerized cargo in the foreign trade.

(363) Vessels calling at Cleveland Harbor may obtain information on river traffic by contacting the Great Lakes Towing Co. dispatcher on VHF-FM channels 16 or 10, or by radiotelephone through a land station, telephone, 621–5094.

(364) An unmarked **dumping ground** with a least reported depth of 35 feet is about 9.3 miles N of the main entrance to Cleveland Harbor.

(365) **Prominent features.**–The most prominent objects when approaching Cleveland Harbor are the Municipal Stadium 0.7 mile E of the mouth of the Cuyahoga River, the Federal Office Building and the Erieview Plaza Tower about 1.1 miles E of the mouth, the Terminal Tower 1 mile SE of the mouth, and the lighted "W" sign 3.3 miles W of the mouth on the lakefront.

(366) **Cleveland Waterworks Intake Crib Light** (41°33.0′N., 81°45.0′W.), 55 feet above the water, is a private aid shown from a gray square house on a red cylindrical crib about 3.3 miles NW of the harbor entrance. A fog signal is at the light.

(367) **Cleveland Harbor East Entrance Light 2** (41°32.6′N., 81°39.1′W.), 59 feet above the water, is shown from a skeleton tower with a red triangular daymark at the NE end of the outer harbor breakwater.

(368) **Cleveland Harbor West Pierhead Light** (41°30.5′N., 81°43.1′W.), 63 feet above the water, is shown from a white conical tower with attached building on the W side of the main entrance to Cleveland Harbor. A fog signal and radiobeacon are at the light.

(369) **Channels.**–Cleveland outer harbor is formed by a series of breakwaters paralleling the shore for about 1 mile W and 4 miles E of the mouth of the Cuyahoga River. Lights mark the ends of each of the breakwaters. The main entrance from Lake Erie is through a dredged approach channel opposite the mouth of the river. The harbor may also be entered at the E end, and small craft may enter at the W end. The anchorage in the outer harbor has a mud and sand bottom. In the inner harbor, dredged channels lead upstream for about 5.6 miles in the Cuyahoga River and for about 1 mile in Old River, which branches W from Cuyahoga River 0.4 mile above the mouth. Lighted and unlighted buoys mark the limits of the dredged areas in the outer harbor. The piers at the mouth of the river are marked on the outer ends by lights.

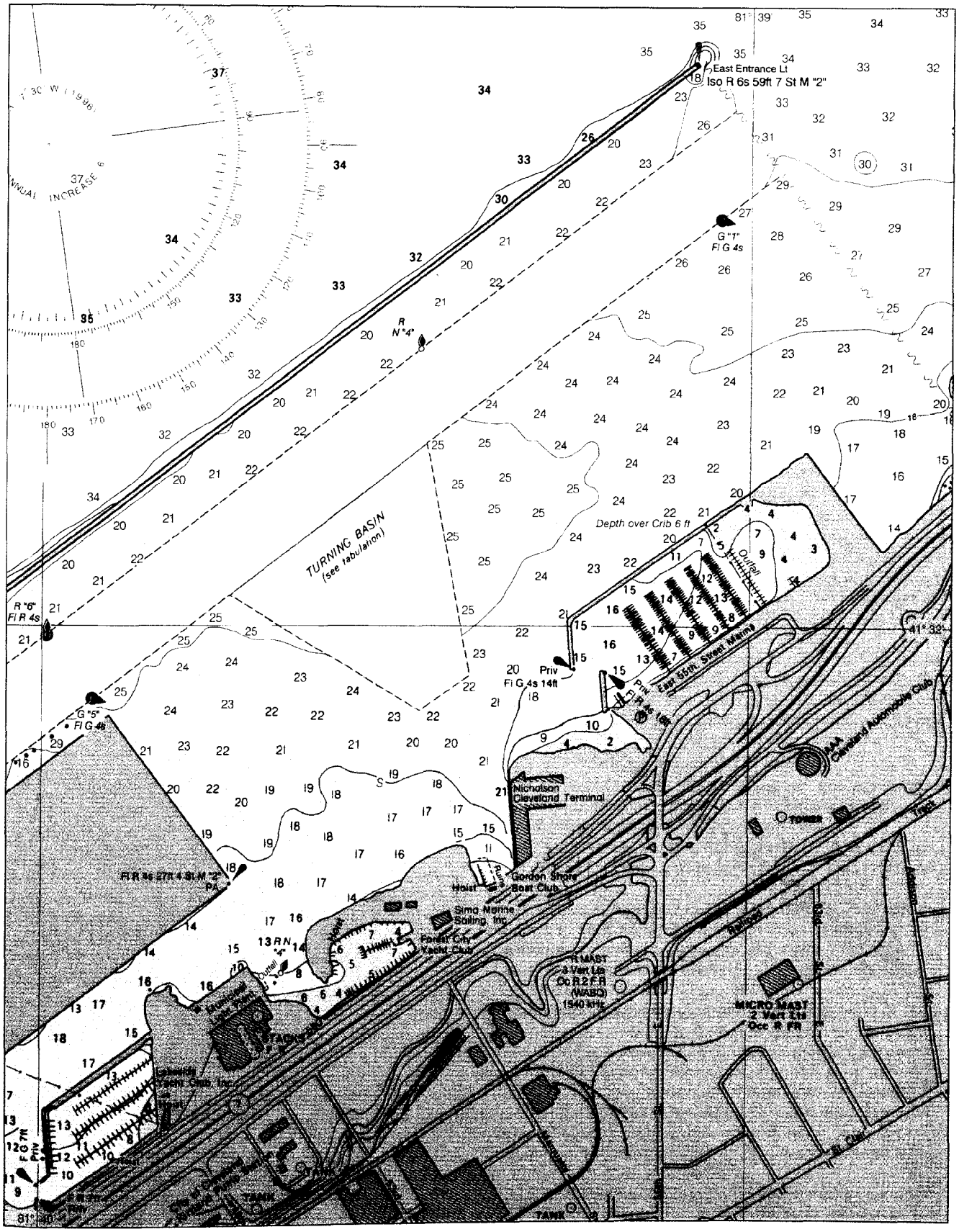
(370) The Federal project depths are 29 feet in the approach channel from deep water in the lake, thence 28 feet through the entrance channel to the mouth of the river and in West Basin, 28-27 feet in East Basin, and 25 feet in Airport Range. In the inner harbor, project depths are 27 feet in the Cuyahoga River from the mouth to the junction with Old River, thence 23 feet to the upstream limit of the project, and 27 feet in Old River. (See Notice to Mariners and latest edition of charts for controlling depths.)

(371) A diked disposal area is in the outer harbor at the NE end of Burke Lakefront Airport.

(372) About 1 mile E of the East Entrance Light, at Gordon Park, a breakwater extends about 1,000 feet NW from shore, then curves to SW for about 1,000 feet. The outer portion is mostly submerged and is marked along its outer side by private unlighted buoys. In April 1978, an 88-acre diked disposal area was under construction enclosing the breakwater and extending E. Orange and white buoys mark the construction area; lights mark the dike.

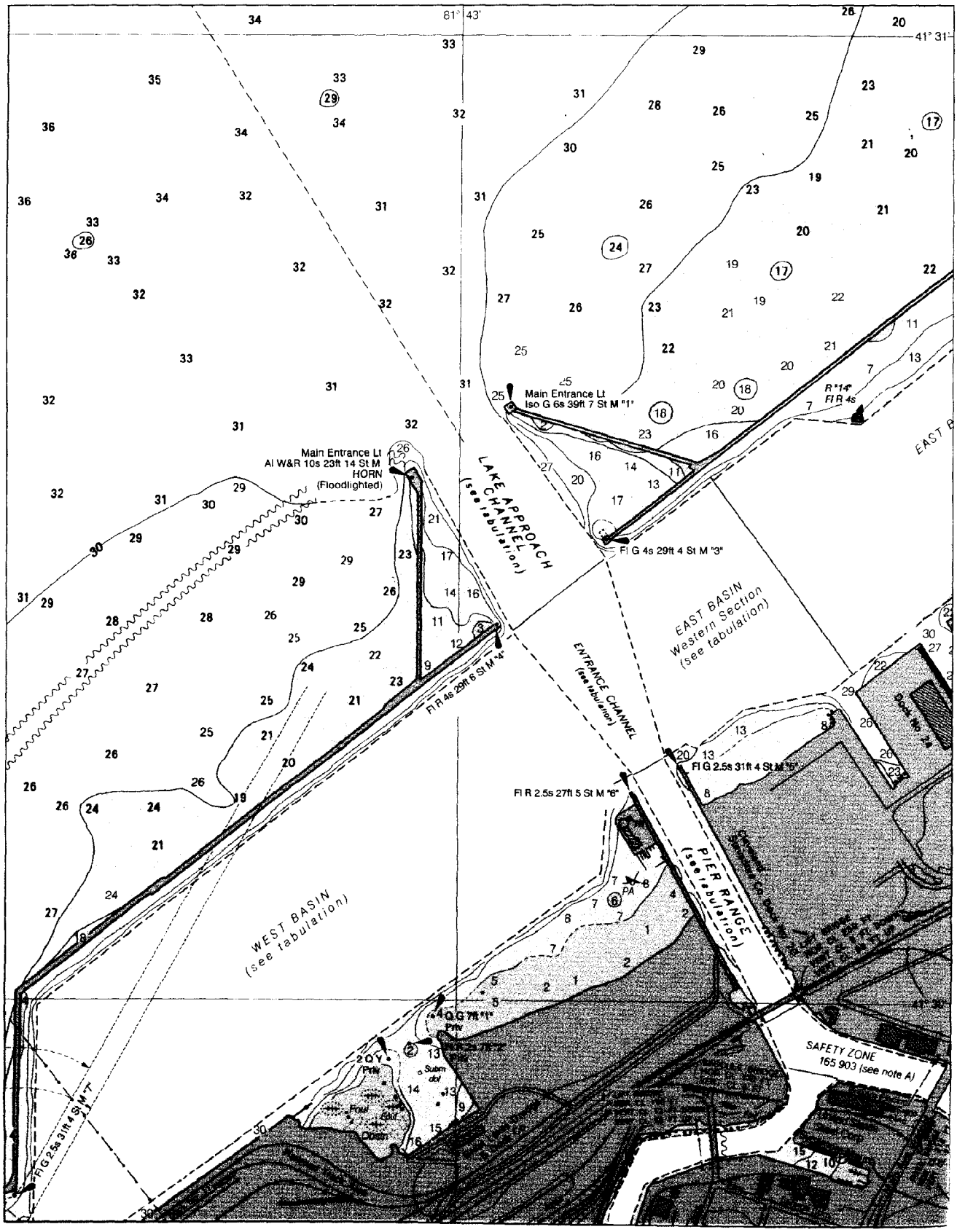
(373) **Anchorages.**–Deep-draft vessels normally anchor about 2 miles SW or 3 miles E of Cleveland Waterworks Intake Crib Light in about 40 to 48 feet of water, clay and gravel bottom. The holding ground at these locations is reported to be good. Avoid anchoring over the potable water intake, the outer end of which is marked by a lighted buoy 0.7 mile W of Cleveland Waterworks Intake Crib Light. General anchorages are in the NW part of West Basin and S of the dredged channel in the E part of East Basin. An explosives anchorage is on the NW side of the E breakwater. (See

**Cleveland, OH**




# Cleveland - East Entrance

**Use Chart 14839 for Navigation**




# Cleveland - West Entrance

**Use Chart 14839 for Navigation**

**33 CFR 110.1 and 110.207,** chapter 2, for limits and regulations.) In 1977, it was reported that the East Basin general anchorage and the explosives anchorage had not been used for about 10 years. The West Basin anchorage has a sand and mud bottom and is used only occasionally. The harbormaster, who has control of the waters for all three anchorages, generally orders vessels to anchor outside the harbor. Vessels are prohibited from anchoring within 2,000 feet W of the main entrance channel.

(374) **Dangers.**–During flood stages of the Cuyahoga River, debris may be encountered in the river and in the outer harbor.

(375) In September 1987, a sunken wreck with 1 to 2 feet of water over it, was reported in the Cuyahoga River on the W bank just S of Carter Road bridge.

(376) **Safety zones** have been established in the vicinity of river bends along Cuyahoga and Old Rivers. Mooring, standing or anchoring is prohibited in these areas. (See **33 CFR 165.1 through 165.7, 165.20 through 165.23, and 165.903**, chapter 2, for limits and and regulations.)

(377) **Caution.**–A submerged cable extends NNW from shore to Cleveland Harbor East Entrance Light. Vessels are cautioned not to drag anchor over the cable.

(378) Heavy small pleasure-craft traffic during the boating season is in Old River and on the Cuyahoga River as far upstream as just below the Conrail Bridge at mile 2.42.

(379) **Local bridge regulations.**–Sec. 7.1511. A copy of the ordinances relating to the management of bridges and viaducts and the signals for opening and closing the same shall be posted up in the pilot house of every tug employed in navigating the Cuyahoga River or old river bed, and the harbormaster is hereby instructed to furnish, upon application, a printed copy of the same to the master of any such tug.

(380) Sec. 7.1701. No more than one boat or craft for which the draw of any bridge has to be opened or swung shall pass through said draw at the same time.

(381) Sec. 7.1706. The captain, bridgetenders, or other persons in charge of any of the drawbridges shall not close the same against vessels or boats seeking to pass through, until passengers and teams have been delayed fully 10 minutes by the said draws of the above-mentioned bridges being open.

(382) Sec. 7.1708. The director of port control shall by rule designate the hours when it may be necessary to keep any city drawbridge closed for the accommodation of traffic.

(383) Sec. 7.1713. No material of any kind shall be deposited under any of the viaducts, without a permit from the Director of Port Control; no material shall be deposited adjacent to viaduct that would injure the structure in case of fire; and no bills, posters, or advertisements of any kind shall be posted on any part of any viaduct.

(384) Sec. 7.1714. Any person violating any of the provisions of this subdivision shall be fined not less than $5 nor more than $25, and shall also be liable to the city for all damage that may be done to the drawbridge by collision or otherwise.

(385) **Weather, Cleveland and vicinity.**–Cleveland, OH, located on the south shore of Lake Erie and in northeastern Ohio, averages about 12 days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 83°F (28.3°C) and an average minimum of 62°F (16.7°C). January is the coolest month with an average high of 34°F (1.1°C) and an average minimum of 19°F (-7.2°C). The highest temperature on record for Buffalo is 104°F (40°C) recorded in June 1988 and the lowest temperature on record is -20°F (-28.9°C) recorded in January 1994. About 122 days each year sees temperatures below 32°F (0°C) and an average ten days each year records temperatures below 5°F (-15°C). Every month has seen temperatures below 40°F (4.4°C) except July (41°F, 5°C) and every month except July, August, and September has recorded temperatures at or below freezing (0°C).

(386) The average annual precipitation for Cleveland is 37.2 inches (945 mm) which is fairly evenly distributed throughout the year. Precipitation falls on about 220 days each year. The wettest month is July with 3.6 inches (91 mm) and the driest, February, averages only 2.3 inches (58 mm). An average of 33 thunderstorm days occur each year with June and July being the most likely months. Snow falls on about 84 days each year and averages about 57 inches (1448 mm) each year. December, January, and February each average greater than 12 inches (305 mm) per month. One foot or greater (>305 mm) snowfalls in a 24-hour period have occurred in each month November, December, and February and 14 inches (356 mm) fell in one 24-hour period during February 1993. About 12 days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June, July, August, and September. Fog is present on average 148 days each year and is evenly distributed throughout the year with a slight maximum in August.

(387) The prevailing wind direction in Cleveland is southwest. March is the windiest month. The highest gust on record was a southwest wind of 71 knots recorded in January 1978.

(388) (See page T-5 for **Cleveland climatological table.**)

(389) **Towage.**–Tugs to 2,000 and 1,200 hp are available from Great Lakes Towing Co. or Gaelic Tugboat Co., respectively. Arrangements for tugs are made through the companies' dispatchers in Cleveland at 216-621-4854 (in Ohio, toll free: 800-621-4330) or 216-566-0400, respectively. Both dispatchers may be contacted on VHF-FM channel 16 (156.80 MHz).

(390) At least 2 hours advance notice is requested. Vessels carrying 1,200 tons or more of gasoline, oil, explosives, or other dangerous material, and all vessels carrying 3,000 tons or more of cargo of any kind, must have the assistance of a tug or tugs while navigating the Cuyahoga River S of Superior Avenue.

(391) Cleveland is a **customs port of entry.**

(392) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(393) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(394) **Coast Guard.**–A **Marine Safety Office,** a **vessel documentation office,** and the headquarters of the Ninth Coast Guard District are at Cleveland. (See appendix for addresses.) **Cleveland Coast Guard Station** is on the S side of the outer harbor just W of Burke Lakefront Airport.

(395) **Harbor Regulations.**–Federal regulations specify a **speed limit** of 6 mph (5.2 knots) in the harbor except in the outer harbor where the speed limit is 10 mph (8.7 knots). (See **33 CFR 162.160 and 207.570,** chapter 2, for regulations.) However, the city of Cleveland has adopted a lesser **speed limit** of no wake, 4 mph (3.5 knots) in the Cuyahoga River and Old River. During fog or when a blue light or flag is shown from any pier, wharf, bridge or other place where person or property may be endangered, a **speed limit** of 2 mph (1.7 knots) is enforced.

(396) Local harbor regulations are established by the city of Cleveland and enforced by the **harbormaster** who can be contacted at Water Control Laboratory, New West Pier, Whiskey Island, c/o Water Control Laboratory, 1201 Lakeside Avenue, Cleveland, Ohio 44114. Copies of the regulations can be obtained

## Structures across Cuyahoga River
### *Miles above West Pierhead Light
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Main River** | | | | | | | |
| 1 | ConRail bridge | Railroad | 0.76 | | | 250 | 8 | Vertical lift. Clearance up 98 feet. Note 1. |
| | Junction with Old River | | 0.86 | | | | | |
| 2 | Main Ave. Viaduct | Highway | 1.01 | | | 218 | 92 | Fixed. Vertical clearance 97 feet for 165-foot center width. |
| 3 | CSX RR bridge | Railroad | 1.28 | | | 229 | 8 | Bascule. |
| 4 | Center St. bridge | Highway | 1.39 | | | 113 | 17 | Swing. |
| 5 | Detroit-Superior Viaduct | Highway | 1.42 | | | 113 | 98 | Fixed. |
| 6 | Union Terminal Viaduct | Railroad | 1.89 | | | 200 | 98 | Fixed. |
| 7 | Columbus Rd. bridge | Highway | 1.93 | | | 220 | 17 | Vertical lift. Clearance up 98 feet. |
| 8 | ConRail bridge | Railroad | 2.24 | | | 200 | 8 | Vertical lift. Clearance up 97 feet. |
| 9 | ConRail bridge | Railroad | 2.42 | | | 200 | 23 | Vertical lift. Clearance up 98 feet. |
| 10 | Carter Rd. bridge | Highway | 2.43 | | | 201 | 22 | Vertical lift. Clearance up 97 feet. |
| 11 | Eagle Ave. bridge | Highway | 2.80 | | | 187 | 15 | Vertical lift. Clearance up 97 feet. |
| 12 | Lorain-Carnegie Viaduct | Highway | 3.14 | | | 178 | 96 | Fixed. |
| 13 | ConRail bridge | Railroad | 3.19 | | | 134 | 20 | Bascule. |
| 14 | Norfolk Southern Railroad bridge | Railroad | 3.34 | | | 200 | 64 | Vertical lift. Clearance up 97 feet. |
| 15 | Inner Belt Freeway bridge | Highway | 3.42 | | | 230 | 93 | Fixed. Vertical clearance 97 feet for 199-foot center width. |
| 16 | W 3rd St. bridge | Highway | 3.69 | | | 200 | 10 | Vertical lift. Clearance up 97 feet. |
| 17 | Overhead cable | Power | 3.71 | | | | 124 | |
| 18 | Jefferson Ave. bridge | Highway | 4.51 | | | 100 | | Superstructure removed. |
| 19 | Newburgh & South Shore Ry. bridge | Railroad | 4.71 | | | 102 | 11 | Bascule. |
| 20 | Overhead cable | Power | 4.72 | | | | 118 | |
| 21 | CSX RR bridge | Railroad | 4.75 | | | 102 | 10 | Bascule. |
| 22 | Overhead cable | Power | 4.76 | | | | 118 | |
| | Junction with Turning Basin | | 4.91 | | | | | |
| 22A | I-490 Bridge | Highway | 4.79 | | | 110 | 101 | Fixed |
| 23 | Overhead cable | Power | 5.34 | | | | 122 | |
| 24 | Overhead conveyor | | 5.35 | | | 210 | 99 | |
| 25 | Overhead pipeline | | 5.39 | | | 210 | 99 | |
| 26 | River Terminal RR bridge | Railroad | 5.42 | | | 129 | 15 | Bascule. |
| 27 | Norfolk Southern Railroad bridge | Railroad | 5.47 | | | 200 | 28 | Vertical lift. Clearance up 97 feet. |
| 28 | Overhead cable | Power | 5.49 | | | | 122 | |
| 29 | Norfolk Southern Railroad bridge | Railroad | 6.07 | | | 27 | 14 | Fixed. |
| 30 | Overhead cable | Telephone | 6.08 | | | | | Data not available. |
| 31 | Newburgh & South Shore Ry. bridge | Railroad | 6.09 | | | 59 | 14 | Fixed. |
| 32 | Overhead cable | | 6.10 | | | | 118 | |
| | **Old River** | | | | | | | |
| | Junction with Main River | | 0.86 | | | | | |
| 33 | CSX RR bridge | Railroad | 0.89 | | | 170 | 6 | Bascule. |
| 34 | Willow Ave. bridge | Highway | 1.02 | | | 150 | 12 | Vertical lift. Clearance up 98 feet. |

**Note 1.**—The bridgetender monitors VHF-FM channel 16 and works on channel 13; call sign, KUF-618.

**See 33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.

Bridges over Cuyahoga River will be closed to river traffic as follows: Carter Road and Eagle Avenue bridges, 0730 to 0800, 0815 to 0845, 1615 to 1645, and 1700 to 1730, provided that when these two bridges are opened between 0800 and 0815 and between 1645 and 1700 the opening shall be so timed as to permit a moving vessel to pass through both draws; Columbus Road and West Third Street, 0730 to 0800 and 1700 to 1730. The above hours are not applicable to Sundays, legal holidays, and Saturday afternoons, nor at times of emergency when fire tugs request the opening of any draw, nor when there is a swift current in the river. The rush hour bridge closures do not apply to commercial vessels; however, commercial vessels are asked to voluntarily comply with such closures.

from the Office of the City Clerk, Room 216, City Hall, 601 Lakeside Avenue, Cleveland, Ohio 44114.

(397) **Wharves.**–There are extensive waterfront facilities in Cleveland outer harbor and along both banks of Cuyahoga River and Old River. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 43, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have highway connections, and many have railway, water, and electrical shore-power connections. Cargo in the port is generally handled by ships' tackle. Cranes to 230 tons and floating cranes to 30 tons are available. Many of the piers, wharves, and docks are available for winter mooring of vessels during the closed navigation season.

(398) **Facilities in East Basin:**

(399) **Cleveland-Cuyahoga County Port Authority** operates five wharves on the S side of East Basin that are owned by the city of Cleveland. The deck height at all these wharves is 10.4 feet. Four transit sheds provide 259,000 square feet of covered storage, and there is 14 acres of open storage. Cranes to 230 tons and forklifts to 31 tons are available.

(400) **Dock No. 32 E:** (41°30′31″N., 81°41′54″W.); 712-foot face; 27 feet alongside; receipt and shipment of general, hazardous, and containerized cargo, receipt of aluminum pigs, handling of steel products.

(401) **Dock Nos. 32 N, 30, 28 N:** immediately W of Dock No. 32 E; 1,608-foot face; 30 to 27 feet alongside; receipt and shipment of general and containerized cargo, receipt of aluminum pigs, handling of steel products. In addition, hazardous cargo may be received, shipped, and stored at Dock 32N.

(402) **Dock No. 28 W:** adjacent to Dock No. 28 N; 710-foot face; 28 to 26 feet alongside; receipt and shipment of general and containerized cargo, receipt of aluminum pigs, handling of steel products and heavy-lift items.

(403) **Dock No. 26:** across slip W from Dock No. 28 W; 698-foot E face, 297-foot N face, 681-foot W face; 25 to 26 feet alongside; receipt and shipment of general and containerized cargo.

(404) **Dock No. 24:** across slip W from Dock No. 26; 672-foot E face, 519-foot N face, 642-foot W face; 27 feet alongside; receipt and shipment of general and containerized cargo and steel products; receipt of fluorspar, bauxite, and newsprint.

(405) **Facilities in West Basin:**

(406) **ConRail Ore Dock No. 11:** (41°29′47″N., 81°43′23″W.); 1,875 feet of berthing space with dolphins; 30 to 24 feet alongside; deck height, 9 feet; four hulett-type ore unloaders, capacity 800 tons per hour each; 36,000-ton storage trough; open storage for 1 million tons of ore; receipt of iron ore and iron ore pellets; owned by ConRail and operated by Ohio and Western Pennsylvania Dock Co.

(407) **Facilities in Cuyahoga River below the junction with Old River:**

(408) **Cleveland-Cuyahoga County Port Authority Dock No. 20:** E side of Cuyahoga River inside the entrance; 775-foot face; 27 feet alongside; deck height, 8 feet; front-end loader; open storage for 240,000 tons of material; receipt of pellets, scrap metal, and ferrous metal turnings; operated by Cleveland-Cuyahoga County Port Authority.

(409) **Ontario Stone Corp., Dock No. 1:** (41°29′56″N., 81°42′34″W.); 500 feet of usable berthing space; 25 feet alongside; deck height, 8 feet; four mobile front-end loaders; open storage for 140,000 tons of limestone; receipt of limestone; owned and operated by Ontario Stone Corp.

(410) **Facilities in Old River:**

(411) **United States Steel Corp., Sycamore Slip Wharf:** S side of the river mouth; 240-foot face; 18 to 20 feet alongside; deck height, 6 feet; open storage for 10,000 tons of limestone; receipt of limestone; owned by United States Steel Corp. and operated by various operators.

(412) **Huron Cement Cleveland Terminal Wharf:** (41°29′50″N., 81°42′32″W.); 415-foot face; 24 feet alongside; deck height, 7.8 feet; silo storage for 36,000 tons of cement; receipt of bulk cement; owned and operated by Cement Division, National Gypsum Co.

(413) **Ontario Stone Corp., Dock No. 3:** W side of Old River opposite Nypando Dock; 600-foot face; 25 feet alongside; deck height, 8 feet; four front-end loaders available; open storage for 200,000 tons of material; receipt of limestone, manganese ore, and iron ore pellets; owned and operated by Ontario Stone Corp.

(414) **Sand Products Corp., Dock No. 1:** N side of Old River 1,500 feet above Ontario Stone Corp., Dock No. 3; 1,000 feet of berthing space along natural bank; 20 to 25 feet alongside; one mobile front-end loader; silo storage for 1,000 tons of sand; receipt of sand; owned and operated by Sand Products Corp.

(415) **Ashland Petroleum Co. Wharf:** E side of slip immediately W of Sand Products Corp., Dock No. 1; 195 feet of berthing space with dolphins; 20 feet alongside; deck height, 10 feet; tank storage for 382,000 barrels; receipt and shipment of petroleum products; owned and operated by Ashland Petroleum Co.

(416) **International Salt Co. Dock:** W side of slip, opposite Ashland Petroleum Co. Wharf; 602-foot face; 18 to 24 feet alongside; deck height, 12 feet; fixed loading tower, capacity 3,300 tons per hour; storage tank, capacity 40,000 tons; shipment of graded dry bulk rock salt; owned and operated by International Salt Co.

(417) **Facilities in the Cuyahoga River above the junction with Old River:**

(418) **Alpha Concrete Corp. Wharf:** NE side of river opposite mouth of Old River; 300 feet of berthing space; 15 to 22 feet alongside; deck height, 6 feet; open storage for 5,000 tons of stone; receipt of stone; owned by Joseph Waters and operated by Alpha Concrete Corp.

(419) **Cereal Food Processors Dock:** E side of river about 250 feet above Center Street bridge; 350-foot face; 22 to 18 feet alongside; deck height, 8 feet; grain unloading tower, capacity 8,000 bushels per hour; storage silos and bins for 500,000 bushels of grain; receipt of grain; owned and operated by Cereal Food Processors, Inc.

(420) **Cuyahoga Lime Co. Dock:** E side of river about 700 feet above Cereal Food Processors Dock; 245-foot face; 20 to 25 feet alongside; deck height, 8 feet; one front-end loader; open storage for 80,000 tons of limestone; receipt of limestone; owned and operated by Cuyahoga Lime Co.

(421) **Medusa Cement Co., Cleveland Dock:** W side of river 0.2 mile above Columbus Road bridge; 600-foot face; 20 to 23 feet alongside; deck height, 5 to 6 feet; silo storage for 8,000 tons of cement; receipt of bulk cement; owned and operated by Medusa Cement Co.

(422) **Alpert Bros. Leasing Co. Lower Dock:** E side of river 0.2 mile above Columbus Road bridge; 895-foot face; 18 to 24 feet alongside; deck height, 10 feet; 35-ton mobile hoist; 3 acres open storage; receipt of sand and stone; owned by Alpert Bros. Leasing, Inc. and operated by Alpha Precast Corp.

(423) **Mid-Continent Coal and Coke Wharf:** E side of river between Eagle Avenue bridge and Lorain Carnegie Viaduct;

1,000-foot face N end, 550-foot face S end; 8 feet alongside; deck heights, 6 to 9 feet; coke breeze loading tower at S end, capacity 400 tons per hour; open storage for 20,000 tons of coke breeze; shipment of coke breeze; owned by city of Cleveland and Mid-Continent Coal and Coke, and operated by Mid-Continent Coal and Coke.

(424) **Ford Motor Co. Dock:** E side of river above Mid-Continent Coal and Coke Wharf; 630 feet of berthing space; 19 to 23 feet alongside; deck height, 8 to 10 feet; one front-end loader; open storage for 780,000 tons of limestone; receipt of limestone and iron ore pellets; owned and operated by Ford Motor Co.

(425) **Cleveland Builders Supply Co., Dock No. 2:** N side of river immediately E of Inner Belt Freeway bridge; 1,680 feet of berthing space; 24 feet alongside; deck height, 6 to 8 feet; open storage for 185,000 tons of material; receipt of sand, limestone, and other bulk materials; owned and operated by Cleveland Builders Supply Co.

(426) **Cleveland Builders Supply Co., Dock No. 4:** SE side of the river between Inner Belt Freeway bridge and W 3rd Street bridge; 763 feet of berthing space, 23 to 18 feet alongside, deck heights, 6 and 7 feet; open storage for 40,000 tons of material; receipt of bulk materials and fuel oils; owned and operated by Cleveland Builders Supply Co.

(427) **Cleveland Builders Supply Co., "F"** Mill Dock: SE side of the river immediately below W 3rd Street bridge; 422-foot face; 10 to 22 feet alongside; deck height, 8 feet; receipt of sand; owned and operated by Cleveland Builders Supply Co.

(428) **Ontario Stone Corp., Dock No. 2:** NW side of river immediately above W 3rd Street bridge; 565 feet of berthing space; 22 feet alongside; deck height, 8 feet; open storage for 100,000 tons of limestone; receipt of limestone; owned by United Garage and Service Corp. and operated by Ontario Stone Corp.

(429) **Clifton Concrete and Supply Co. Wharf:** W side of the river immediately below ConRail bridge at Mile 4.3; 693-foot face; 23 to 18 feet alongside; deck height, 8 feet; open storage for 43,000 tons of stone and sand; receipt of stone and sand; owned by Mobil Oil Corp. and operated by Clifton Concrete and Supply Co.

(430) **Cleveland Builders Supply Co., Dock No. 1:** W side of the river above the Jefferson Avenue bridge; 480-foot face; 20 to 19 feet alongside; deck height, 8 to 9 feet; one front-end loader; open storage for 70,000 tons of sand and stone; receipt of sand and stone; owned and operated by Cleveland Builders Supply Co.

(431) **Koppers Dock:** W side of the river above Cleveland Builders Supply Co., Dock No. 1; 120 feet of berthing space with dolphins; 19 feet alongside; deck height, 5 feet; storage tanks, capacity 59,000 barrels; receipt of asphalt; owned and operated by Koppers Co., Inc.

(432) **C-I-L Chemicals Wharf:** W side of the river immediately above Koppers Dock; 340 feet of berthing space; 10 to 20 feet alongside; deck height, 8 to 9 feet; storage tanks for 10,000 tons of sulfuric acid; receipt of sulfuric acid; owned and operated by C.I.L. Chemicals, Inc.

(433) **Marine Fueling Wharf:** E side of river immediately below CSX railroad bridge; 535 feet of berthing space; 20 to 22 feet alongside; deck height, 10 feet to piling, 11½ feet to ground; tank storage for 108,000 barrels; receipt of petroleum products; owned and operated by Marine Fueling, Division of Reiss Oil Terminal Corp.

(434) **LTV Steel Co., Cleveland Works, West Side Dock:** W side of the river between CSX bridge and River Terminal RR bridge; 2,054 feet of berthing space; 10 to 23 feet alongside; deck height, 10.7 feet; two traveling bridge cranes; open storage for 35,000 tons of limestone and 750,000 tons of iron ore pellets; receipt of iron ore pellets and limestone; shipment of steel products; owned and operated by LTV Steel Co., Cleveland Works.

(435) **LTV Steel Co., Cleveland Works, Lower Dock, East Side:** E side of the river below the Clark Avenue Viaduct; 2,566 feet of berthing space; 23 to 17 feet alongside; deck height, 10.7 feet; open storage for 74,000 tons of material; receipt of limestone and dolomite; shipment of steel products; owned and operated by LTV Steel Co., Cleveland Works.

(436) **LTV Steel Co., Cleveland Works Wharf:** NW side of the river above the Clark Avenue Viaduct; NE section, 1,780-foot face; SW section, 1,000-foot face; 23 to 19 feet alongside; deck height, 9½ feet; open storage for 1 million tons of material; storage tanks, capacity, 238,000 barrels; receipt of limestone, ferrous scrap, iron ore pellets, and fuel oil; shipment of steel products; owned and operated by LTV Steel Co., Cleveland Works.

(437) **LTV Steel Co., Cleveland Works, Fuel Oil Dock:** SE side of the river above the Clark Avenue Viaduct; 1,150-foot face; 20 feet alongside; deck heights, 12 feet and 8 to 12 feet; storage tank, capacity 285,000 barrels; receipt of fuel oils; owned and operated by LTV Steel Co., Cleveland Works.

(438) **LTV Steel Co., Cleveland Works, Upper Dock:** adjacent above Republic Steel Corp., Cleveland District Dock; 1,250 feet of berthing space; 23 to 20 feet alongside; deck height, 10 feet; open storage for 674,000 tons of iron ore pellets; receipt of iron ore pellets; owned and operated by LTV Steel Co., Cleveland Works.

(439) **Supplies.**–All types of marine supplies and provisions are available at Cleveland. Vessels normally receive bunker and diesel fuels at their berths from self-propelled vessels.

(440) **Repairs.**–The Halvorsen Boiler and Engineering Company maintains portable equipment for making repairs to vessels at their berths and a machine shop capable of producing shafts 16 feet by 14 inches. G and W Industries, Inc. has a berth on the S side of the river above the Carter Road bridge with a 60-ton crane and floating cranes to 35 tons. They produce shafts up to 12 feet by 36 inches. The above repair companies are on the Cuyahoga River and provide all types of above-the-waterline repairs to vessels in Cleveland harbor.

(441) Great Lakes Towing Company's facility is in Old River and has a 250-ton floating drydock, a heavy lift crane, and complete machinery facilities for above and below-waterline repairs of all types.

(442) **Small-craft facilities.**–Several marinas on the lakefront provide transient berths, gasoline, diesel fuel, water, ice, electricity, launching ramps, and sewage pump-out. Hoists to 40 tons can handle 65-foot vessels for hull, engine, and electronic repairs. A boatyard at the upper end of Old River has a travellift and crane with capacities to 20 tons, and can make small-craft repairs of all kinds. Marine supplies and provisions are available in the city and at several marine supply companies on the Cuyahoga River. Numerous marinas are along the banks of Old River and Cuyahoga River.

(443) **Communications.**–Cleveland is a major transportation terminus. The city is served by several rail lines and has excellent highway connections. Major international and domestic airlines serve Cleveland-Hopkins International Airport in the SW part of the city and Burke Lakefront Airport on the S side of the outer harbor.

(444) **Charts 14826, 14829.**–W from Cleveland, the shore consists of 10- to 20-foot-high bluffs and sandy beaches, and the shoreline trends generally W to **Avon Point** (41°30.9′N., 82°00.8′W.), a broad rounding point projecting somewhat to N

about 15 miles from the Cleveland entrance. From Avon Point to Lorain, about 10 miles SW, the bluffs are smaller. Between Cleveland and Lorain, deep water is no more than 1.2 miles offshore except just E of Lorain where detached shoal spots extend 3 miles into the lake. An artificial reef marked by private buoys is about 0.6 mile offshore 2.6 miles ENE from the mouth of Rocky River. A wreck, covered 30 feet, is 4.3 miles NNE of Avon Point.

(445) **Rocky River Harbor** is at the mouth of the **Rocky River,** about 6.5 miles W of Cleveland Harbor entrance, at the city of **Lakewood, Ohio.**

(446) Two unmarked **dumping grounds** with least reported depths of 35 feet are 1.3 and 3.6 miles N of the mouth of Rocky River.

(447) **Channels.**–The harbor is entered from Lake Erie through a dredged entrance channel on the SW side of a pier that extends lakeward from the E side of the mouth of Rocky River. Lights mark the outer and inner ends of the pier. The dredged channel extends upstream for 0.9 mile above the mouth to a turning basin at the head. An anchorage basin is on the SW side of the channel just inside the mouth of the river. In June 1998, the controlling depths were 4½ feet to the boat basin on the W side of the river just above the anchorage basin, except for extreme shoaling at the NE channel limit opposite the N end of the anchorage basin; thence in June-September 1998, 6 feet at midchannel to the Norfolk Southern Railway bridge; thence in August-September 1998, 3½ feet at midchannel to the turning basin at the head; thence depths of 1 foot or less were in the middle of the turning basin. In June 1998, depths of 5 to 7 feet were in the anchorage basin just inside the mouth of the river; lesser depths were along the SW edge.

(448) **Bridges.**–Three fixed bridges with a least clearance of 49 feet cross the navigable portion of Rocky River. The Clifton-Westlake highway bridge, the Norfolk Southern Railway bridge, and the Detroit Road highway bridge are 0.4, 0.5, and 0.7 mile above the mouth, respectively. Overhead power cables with a minimum clearance of 49 feet are just below the railroad bridge and just below the Detroit Road bridge.

(449) **Harbor regulations** have been established by the city of Lakewood. The Department of Public Safety enforces a 6 mph (5.2 knots) **speed limit.** Copies of the regulations may be obtained from the Department of Public Safety.

(450) **Small-craft facilities.**–Most of the facilities in the harbor are private. However, limited transient berths, gasoline, water, electricity, a launching ramp, and marine supplies are available. Hoists to 6 tons are available for hull and engine repairs.

(451) About 2.2 miles WSW of Avon Point, a private light marks the outer end of the breakwaters protecting the intake channel of the Cleveland Electric Illuminating Co. A wreck, covered 6 feet, is close N of the light.

(452) **Charts 14826, 14829, 14841.–Lorain Harbor,** serving the city of **Lorain, Ohio,** is about 25 miles W of Cleveland Harbor. It comprises the lower 3 miles of the **Black River** and an outer harbor.

(453) An unmarked **dumping ground** with a least reported depth of 35 feet is centered about 3.5 miles N of the harbor entrance.

(454) **Prominent features.**–The ore docks on the W side of the mouth of Black River and the stacks of the powerplant 0.3 mile SW of the mouth are prominent.

(455) **Lorain Harbor Light** (41°28.9′N., 82°11.7′W.), 60 feet above the water, is shown from a white tower on the W end of the detached breakwater on the N side of the entrance channel. A fog signal is at the light.

(456) **Channels.**–The harbor is entered through a dredged entrance channel that leads ESE from the deep water in Lake Erie on the S side of a detached breakwater, and then leads SE between converging breakwaters to the mouth of Black River. The mouth of the river is entered between parallel piers, and the dredged channel leads upstream for about 2.8 miles. Turning basins are 1.6 miles above the mouth and at the head of the project. In the outer harbor, basins are on either side of the entrance channel. From the S side of the outer harbor W basin, an approach channel leads SE to the municipal pier 0.2 mile W of the mouth of the river. Lights mark the ends of the breakwaters and the piers at the river mouth. Buoys mark the E limit of the dredged basin in the outer harbor.

(457) In February 1998, the controlling depths were 26 feet (27 feet at midchannel) from deep water in the lake to the lakeward end of the converging breakwaters; thence 24 feet (27 feet at midchannel) to the Lorain Yacht Basin; thence 15 feet (23 feet at midchannel) to just below the upstream Federal project limit with 17 feet in the lower basin except for lesser depths to 10 feet along the edges and 8 to 14 feet in the upper turning basins. The depths in the E and W basins of the outer harbor were 21 feet in the E and 20 feet in the W basin with lesser depths along the edges of both.

(458) A semicircular diked disposal area is on the NE side of the E breakwater. A floating breakwater extends about 750 feet at right angles from the SW side of the same breakwater.

(459) **Dangers.**–Several detached shoals are in the approach to Lorain Harbor. A shoal with least depths of 22 feet extends 1.4 miles from shore within 2 miles E of the harbor entrance. Several shoal spots with depths of 24 to 28 feet are from 1.4 to 2.4 miles N of Lorain Harbor Light.

(460) **Bridges.**–Erie Avenue bridge, about 0.6 mile above the mouth of Black River, has a bascule span with a clearance of 33 feet at the center. Norfolk Southern Railway bridge, 1.2 miles above the mouth, has a vertical lift span with clearances of 35 feet down and 123 feet up. The 21st Street bridge, 2 miles above the mouth, has a fixed span with a clearance of 97 feet. An overhead power cable on the E side of the bridge has a clearance of 120 feet. (See **33 CFR 117.1 through 117.59 and 117.850,** chapter 2, for drawbridge regulations.)

(461) **Towage.**–Tugs for Lorain are available from Cleveland. (See Towage under Cleveland.)

(462) Lorain is a **customs station.**

(463) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(464) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(465) **Coast Guard.**–Lorain Coast Guard Station is on the E side of the Black River just inside the mouth.

(466) **Harbor regulations.**–A **speed limit** of 6 mph (5.2 knots) is enforced in the harbor except in the outer harbor where it is 10 mph (8.7 knots). (See **33 CFR 162.160 and 207.570,** chapter 2, for regulations.)

(467) Local harbor regulations are established by the City of Lorain. Information may be obtained by contacting the Lorain Port Authority, City Hall, 200 West Erie, Lorain, Ohio 44052, telephone: (216) 244-2269.

(468) **Wharves.**–Lorain has piers and wharves in the SW part of the outer harbor and along both sides of the Black River. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold

by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For the latest depths, contact the operator.) All the facilities described have highway connections. Many have railroad, water, and electrical shore-power connections. Special cargo handling equipment is described under the individual facilities. Many of the facilities are used for mooring vessels during the closed navigation season.

(469) **LTV Steel Co. Lorain Pellet Terminal Mooring Basin:** 0.1 mile W of Black River; NE face 1,090 feet berthing space; 20 to 23 feet alongside; SW face 1,095 feet berthing space; 25 feet alongside; deck height, 8 feet; mooring of vessels awaiting berth at LTV Steel Co. Lorain Pellet Terminal Wharf; owned and operated by LTV Steel Co.

(470) **LTV Steel Co. Lorain Pellet Terminal Wharf:** W side of the river 0.2 mile above the outer end of the W pier; 2,200 feet of berthing space; 27 feet alongside; deck height, 8 feet; open storage for 532,000 tons of ore; receipt and shipment of iron ore pellets; owned and operated by LTV Steel Co.

(471) **Erie Sand and Gravel Co., Lorain Dock:** W side of the river below the Norfolk Southern Railway bridge; 460 feet of berthing space; 21 to 27 feet alongside; deck height, 6½ to 8 feet; two front-end loaders and crawler crane; receipt of sand and stone; owned and operated by Erie Sand and Gravel Co.

(472) **United States Steel Corp., Lorain-Cuyahoga Works, Slag Dock:** W side of the river 0.3 mile above the 21st Street bridge; 220 feet of berthing space with dolphins; 20 feet alongside; front-end loaders; open storage for 30,000 tons of material; receipt of miscellaneous dry bulk cargo and occasional shipment of crushed slag and coke breeze; owned and operated by United States Steel Corp.

(473) **United States Steel Corp., Lorain Works, Ore Dock:** SW side of the river 0.6 mile above the 21st Street bridge; 2,490-foot face; 26 feet alongside; deck height, 10½ feet; three 20-ton hulett-type ore unloaders with rate of 650 tons per hour each feed conveyor system; open storage for 3 million tons of iron ore and 310,000 tons of limestone; receipt of iron ore and limestone; owned and operated by United States Steel Corp.

(474) **Griffith Blacktop Dock No. 1:** NW side of the turning basin at the head of the Federal project and E side of the river just below the basin; 450-foot E face along natural bank, 27 feet alongside; 400-foot W face along natural bank, 27 feet alongside; deck height, 6 feet; open storage for 75,000 tons of material; receipt of crushed stone and sand; owned by United States Steel Corp. and Griffith Blacktop, Inc. and operated by Griffith Blacktop, Inc.

(475) **Gold Bond Building Products, Lorain Plant Wharf:** E side of the river about 0.3 mile above the 21st Street bridge; 750 feet of berthing space with dolphins; 20 feet alongside; deck height, 7 feet; open storage for 120,000 of gypsum rock; receipt of gypsum rock; owned and operated by Gold Bond Building Products, Division of National Gypsum Co.

(476) **Allied Oil Co., Lorain Dock:** N side of river just above 21st Street bridge; 450 feet of berthing space with shore moorings; 23 feet alongside; deck height, 12 feet; 500,000-barrel storage capacity; receipt of fuel oil; owned and operated by Allied Oil Co.

(477) **Griffith Blacktop Dock No. 2:** N and E side of the river below the 21st Street bridge; 200 feet berthing space with platforms; 27 feet alongside; deck height, about 6 feet; 150-ton crawler crane; shipment of pig iron and steel products; receipt of sand; owned by Norfolk Southern Railway Co. and operated by Griffith Blacktop, Inc.

(478) **Adams Dock:** E side of river 0.2 mile above the Norfolk Southern Railway bridge; 300 feet berthing space with dolphins; 27 feet alongside; deck height, 5 feet; covered storage for 10,000 tons of bulk material, open storage for 12,000 tons material; receipt of sand and crushed stone, occasional receipt of miscellaneous bulk materials; owned by Carl M. Adams and operated by North Ridge Trucking Co.

(479) **Terminal Ready-Mix Dock:** N side of the river above the Norfolk Southern Railway bridge; 150-foot face; 500-foot natural bank; 10 to 25 feet alongside; deck height, 5 feet; open storage for 50,000 tons of sand and stone; receipt of sand and stone; owned by Sam Falbo and operated by Terminal Ready-Mix, Inc.

(480) **Supplies.**–Bunker C oil is available by tank barge, and diesel oil is available by truck from local companies. Provisions and marine supplies are available on the N side of the Black River just E of the Erie Avenue bridge.

(481) **Small-craft facilities.**-Marinas in Lorain Harbor are in the outer harbor E of the river mouth, on the NE side of the river just inside the mouth, on the E side of the river just upstream of the Erie Avenue bridge and further upstream on the N side, just past the railroad bridge. Gasoline, diesel fuel, water, ice, sewage pump-out facilities, and some marine supplies are available. A 50-ton travel lift is available at the Marina on the E side of the river, just upstream of the Erie Avenue bridge. Engine repairs are made at a boatyard on the NE side of the river just upstream of the Erie Avenue bridge, a 30-ton hoist is also available.

(482) **Communications.**–Lorain has highway connections and is served by three major rail lines, ConRail, Norfolk Southern, and CSX Transportation, Inc. Lorain County Airport is S of the city.

(483) **Charts 14826, 14829.**–From Lorain, the shoreline trends SW for about 4 miles to Beaver Creek, thence 6 miles W to Vermilion. Throughout this stretch, deep water is about 0.9 mile offshore.

(484) **Beaver Creek,** about 4 miles SW of Lorain Harbor, has a small-craft harbor and summer resort at the mouth. The channel leads S between a pier and a breakwater at the mouth of the river. The entrance is marked by private lights.

(485) In April 1993, the reported depth through the channel was 8 feet. A bar that forms across the entrance reportedly washes out during the spring and after some storms, and restricts the harbor to small craft with shallow drafts. The fixed bridges and cables that cross the creek about 0.3 mile above the mouth have a minimum clearance of 9 feet. Several other overhead cables with unknown clearances cross the creek and the marina slips upstream. This harbor is within the legal boundary of the city of Lorain, and the local harbor regulations of Lorain apply.

(486) A marina inside the mouth of the creek has transient berths, gasoline, diesel fuel by truck, water, electricity, and a 30-ton travel lift for hull and engine repairs. For craft that can navigate under the bridges, three marinas upstream additionally provide gasoline, ice, marine supplies, launching ramps, and engine repairs.

(487) **Charts 14826, 14830.–Vermilion,** about 34 miles W of Cleveland, has a harbor used mainly by fishing and recreational craft. The harbor comprises the lower 3,000 feet of the **Vermilion River,** and an approach channel from the lake. About 0.6 mile SE of the river entrance, a lighted tank with the name VERMILION on the side is prominent.

(488) An unmarked **dumping ground** with a least reported depth of 32 feet is about 2.3 miles N of the entrance to Vermilion River.

(489) **Channels.**–The approach to the river from Lake Erie is through two dredged channels that lead around either end of a

## Structures across Huron River
### *Miles above Huron Harbor Inner Light
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 1 | Overhead cables | Power | 0.72 | | | | 70 | |
| 2 | Cleveland Rd. E. bridge | Highway | 0.73 | | | 86 | 21 | Fixed. |
| 3 | Overhead cable | | 0.73 | | | | 52 | |
| 4 | Overhead cable | Power | 0.77 | | | | 50 | |
| 5 | ConRail bridge | Railroad | 0.79 | 57 | 57 | | 19 | Fixed. |
| 6 | Overhead cable | Power | 0.79 | | | | 50 | |
| 7 | Mason Rd. bridge | Highway | 6.56 | | | 115 | 13 | Fixed. |
| 8 | Fries Landing bridge | Highway | 7.70 | | | 149 | | Bridge removed. Abutments remain. |
| 9 | Norfolk Southern Railroad bridge | Railroad | 7.90 | 102 | 99 | | 35 | Fixed. |
| 10 | Ohio Turnpike bridges | Highway | 8.80 | | | 80 | 30 | Twin fixed. |

detached breakwater, join, and lead S between two piers at the mouth of the river. The channel leads upstream for about 0.6 mile to the Liberty Avenue bridge. Lights mark the ends and center of the breakwater and the ends of the piers.

(490) In August-September 1997, the controlling depths were 5½ feet (8½ feet at midchannel) in the E approach, thence 5 feet in the W approach, thence 5 feet (8½ feet at midchannel) to Superior Lagoon, thence 3 feet to the Liberty Avenue bridge.

(491) **Dangers.**–Just S of the dumping ground, several fish net stakes are in about 32 feet of water. A 6-foot shoal, is about 0.4 mile W of the W approach channel.

(492) **Bridges.**–The Liberty Avenue bridge, 0.7 mile above the pierheads, has a fixed span with a clearance of 12 feet. The ConRail bridge 0.1 mile upstream has a fixed span with a clearance of 21 feet. The Norfolk Southern Railway bridge, 1 mile above the pierheads, has a fixed span with a clearance of 14 feet. Several overhead cables with unknown clearances cross the river in the vicinity of these bridges.

(493) **Harbor Regulations.**–A **speed limit** of 6 mph (5.2 knots) is enforced in the harbor. (See **33 CFR 162.160 and 207.565,** chapter 2, for regulations.)

(494) **Small-craft facilities.**–The Kishman Fish Co. operates a 450-foot wharf on the W side of the river 0.4 mile above the entrance. There are depths of 9 to 15 feet reported alongside and a deck height of 5 feet.

(495) Several marinas in the lower 1.2 miles of the river provide transient berths, gasoline, diesel fuel, water, ice, electricity, launching ramps, and marine supplies. Hoists to 20 tons are available at several boatyards in the river for hull and engine repairs.

(496) **Chart 14830.**–From Vermilion, the shoreline extends SW for about 7.3 miles to the southernmost point of Lake Erie. Along this stretch, rocky shallows extend 1 mile offshore with deep water as much as 1.5 miles off. Thence NW for 3.4 miles to Huron Harbor, deep water is about 1 mile offshore except just E of Huron Harbor. An unmarked 13-foot spot is near the outer end of a shoal that extends 1.5 miles into the lake ENE of the Huron Harbor entrance channel.

(497) **Charts 14830, 14843.–Huron Harbor** is about 44 miles W of Cleveland inside the mouth of the **Huron River** at the city of **Huron, Ohio.**

(498) Grain, iron ore, and limestone are the principal commodities handled at the port.

(499) An unmarked **dumping ground** with a least reported depth of 35 feet is 3 miles N of the entrance to Huron Harbor.

(500) **Prominent features.**–The stacks of the Huron Lime Co. on the E side of the river mouth are prominent.

(501) **Huron Harbor Light** (41°24.3′N., 82°32.6′W.), 80 feet above the water, is shown from a white square pyramidal tower on the W pierhead. A fog signal is at the light.

(502) **Channels.**–The harbor is entered through a dredged channel that leads SW from deep water in Lake Erie between a pier and an adjacent disposal area on the NW side, and a breakwater on the SE side to the mouth of the Huron River. The channel leads into the river to a turning basin with its upper end about 0.4 mile above the mouth. Buoys mark the entrance channel, and lights mark the outer end of the pier and breakwater and each side of the river mouth. Federal project depths are 29 feet in the entrance channel to the inner end of the W pier, thence 28 feet to the turning basin, thence 27 feet in the E half of the basin and 21 feet in the W half of the basin. (See Notice to Mariners and latest editions of charts for controlling depths.) Huron River is navigable by small craft for about 10 miles above the mouth.

(503) A semicircular diked disposal area is on the W side of the W pier.

(504) **Dangers.**–An extensive area of fish net stakes is off the entrance to Huron Harbor.

(505) **Towage.**–Tugs for Huron are available from Cleveland. (See Towage under Cleveland.)

(506) Huron is within the Sandusky **customs port of entry.**

(507) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(508) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(509) **Harbor Regulations.**–A **speed limit** of 6 mph (5.2 knots) is enforced in the harbor except in the outer harbor where the speed limit is 10 mph (8.7 knots). (See **33 CFR 162.155 and 207.570,** chapter 2, for regulations.)

(510) Local harbor regulations are established by the city of Huron and enforced by local law enforcement officials. Copies of the regulations may be obtained from the City Manager, Municipal Building, Huron, Ohio 44839.

(511) **Wharves.**–Huron Harbor has deep-draft facilities on the E side of the Huron River and in the two slips that extend SE just inside the mouth of the river. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For the latest depths, contact the operator.) The facilities described have highway and rail connections. The Norfolk Southern Railway Co., Ore Dock has water connections. During the closed navigation season, vessels moor in Slip No. 1. Special arrangements can be made for electrical connections.

(512) **The Pillsbury Co., Grain Elevator Wharf:** W side of Slip No. 2; 832-foot face; 27 feet alongside; deck height, 10½ feet at center and 6½ feet at ends; 1¾-million-bushel grain elevator; fixed tower equipped with a marine leg, and a loading spout, capacity 25,000 bushels per hour; shipment of grain; owned and operated by The Pillsbury Co.

(513) **Lake Erie Dock Co., Ore Dock:** E side of Slip No. 2; 1,400-foot face; 27 to 26 feet alongside; deck height, 8 feet; two 17-ton hulett-type ore unloaders, capacity 1,700 tons per hour; open storage for 150,000 tons of ore; receipt of iron ore; owned by Norfolk Southern Railway Co. and operated by Lake Erie Dock Co.

(514) **Huron Lime Co., Stone Dock:** E side of the river mouth and the outer E side of Slip No. 1; total of 1,100 feet of berthing space; 28 to 24 feet alongside channel face, 24 to 16 feet alongside curved section, 16 to 17 feet along E side of Slip No. 1; deck height, 8 feet; one front-end loader; open storage for 120,000 tons of limestone; silos for 1,800 tons of lime; receipt of limestone; owned by Norfolk Southern Railway Co. and operated by Huron Lime Co.

(515) **Supplies.**–Marine supplies are available in the city. Diesel fuel and provisions are available by truck from Sandusky.

(516) **Small-craft facilities.**–Numerous small-craft facilities are on the W side of the lower mile of the Huron River. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, and launching ramps are available. Lifts to 20 tons are available for hull, engine, and electronic repairs.

(517) **Communications.**–Huron has highway connections and is served by ConRail and Norfolk Southern Railway.

(518) **Chart 14830.**–From Huron, the wooded shoreline trends NW for 9.7 miles to **Cedar Point** (41°29.5′N., 82°41.3′W.), the SE entrance point to Sandusky Bay. In this stretch, deep water is about 0.9 to 1.2 miles off except at Cedar Point where the shallow depths widen to 1.5 miles.

(519) **Charts 14830, 14844, 14842, 14845.–Sandusky Harbor,** serving the city of **Sandusky, Ohio,** is in the SE part of Sandusky Bay about 50 miles W of Cleveland. The harbor is a major shipping point for coal. Sand, gypsum, and fish are also handled. The harbor is an excellent natural harbor of refuge for small craft.

(520) An unmarked **dumping ground** with a least reported depth of 30 feet is 2.7 miles N of Sandusky Harbor entrance channel.

(521) **Prominent features.**–A large amusement park on Cedar Point, brightly lighted at night, is conspicuous. The most prominent object in the park is the 330-foot observation tower on the E side of Cedar Point, 0.9 mile from the N extremity. The Erie County Courthouse lighted clock tower in the city is also prominent.

(522) **Sandusky Harbor Breakwater Light** (41°30.0′N., 82°40.5′W.), 66 feet above the water, is shown from a white skeleton tower with an enclosed top on the outer end of the jetty that extends NE from Cedar Point. A fog signal is at the light.

(523) **Channels.**–The harbor is entered from Lake Erie through a dredged entrance channel that leads SW from deep water in the lake along the NW side of a jetty extending NE from Cedar Point. Inside Cedar Point, the channel turns SSW across Sandusky Bay. About midway across the bay, the channel divides with the deeper channel leading W then S along a deep-draft wharf to a turning basin at the SW corner of the harbor. The shallower channel continues SSW to a channel leading W along the Sandusky docks to the turning basin.

(524) The dredged channels are marked by lighted and unlighted buoys and lighted ranges. The lighted clock tower of the Erie County Courthouse is prominent on the line of **017°** Inner Range which marks Upper and Lower Straight Channels.

(525) Federal project depths are 26 feet in Moseley Channel, 25 feet in the Upper Straight Channel and Upper Bay Channel, 24 feet in Lower Bay Channel and the turning basin, 22 feet in Dock Channel, and 21 feet in Lower Straight Channel. (See Notice to Mariners and latest edition of charts for controlling depths.)

(526) It is the recommendation of the Lake Carriers' Association that, at the junction of the straight channel and the bay channel, the master of an outbound vessel should slow down if necessary to avoid meeting vessels at the intersection. This recommendation should not be construed as relieving the inbound vessel of the obligation to exercise due caution in approaching the intersection.

(527) **Anchorages.**–A special anchorage is in a basin on the E side of Sandusky Bay about 1.3 miles SE of the entrance. (See **33 CFR 110.1 and 110.83a,** chapter 2, for limits and regulations.)

(528) **Dangers.**–In 1977, it was reported that the jetty extending NE from Cedar Point is partially submerged during periodic high water conditions.

(529) **Caution.**–A submarine cable crosses the inner end of Moseley Channel; vessels are cautioned not to drag anchor in this area.

(530) **Fluctuations of water level.**–In addition to the fluctuations of level that affect Lake Erie somewhat uniformly, strong winds produce abnormal fluctuations in Sandusky Bay. In combination with prevailing high or low water, these abnormal fluctuations may reach a maximum effect of 6 feet above or 2½ feet below Low Water Datum.

(531) **Towage.**–Tugs for Sandusky are available from Cleveland or Toledo. (See Towage under Cleveland and Toledo.)

(532) Sandusky is a **customs port of entry.**

(533) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(534) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(535) **Coast Guard.**–Search and rescue functions for Sandusky Harbor are handled by Marblehead Coast Guard Station, 4 miles NW of Cedar Point.

(536) **Harbor Regulations.**–A **speed limit** of 10 mph (8.7 knots) is enforced in Sandusky Harbor. (See **33 CFR 162.155 and 207.560,** chapter 2, for regulations.)

(537) **Wharves.**–Sandusky has numerous waterfront facilities along the S side of the harbor, but only a few deep-draft facilities. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For latest depths, contact the operator.) Rail, highway, water, and electrical shore-power connections are available at the berths except at the Erie Sand and Gravel Co., Salt Dock where only highway connections are available.

(538) **Erie Sand and Gravel Co. Dock:** (41°27′24″N., 82°43′15″W.); 188-foot face; 14 to 12 feet alongside; deck height, 6 feet; open storage for 30,000 tons of materials; crawler crane for unloading sand; deep-draft vessels discharge by boom from Dock Channel; receipt of sand, salt, and gypsum; owned and operated by Erie Sand and Gravel Co.

(539) **Erie Sand and Gravel Co., Salt Dock:** 450 feet W of Erie Sand and Gravel Co. Dock; 150-foot face; 16 to 0 feet alongside; deck height, 3 feet; open storage for 160,000 tons of salt; deep-draft vessels discharge by boom from Dock Channel; receipt of salt; owned by Great Lakes Dock and Dredge Co. and operated by Erie Sand and Gravel Co.

(540) **Lower Lake Dock Co., Pier No. 3:** (41°27′32″N., 82°43′55″W.); 3,495-foot E side; 25 feet alongside; deck height, 12 feet; open storage for 850,000 tons of coal; one fixed car dumper with chute for loading vessels; winter mooring; shipment of coal; owned by Norfolk Southern Railway Co. and operated by Lower Lake Dock Co.

(541) **Supplies.**–Deep-draft vessels do not normally obtain provisions at Sandusky. Vessels are supplied with bunker coal at Lower Lake Dock Co., Pier No. 3.

(542) **Small-craft facilities.**–Sandusky Harbor has several marinas, the largest on the W side of Cedar Point. In 1977, the reported controlling depth in the entrance and basin of this marina was 11 feet. However, there are lesser depths in the approach to the marina. Gasoline, diesel fuel, water, ice, electricity, sewage pumpout facilities, marine supplies, hull, engine and electronic repairs, a 50-ton travel lift, and a launching ramp are available. Other facilities are along the S side of Sandusky Harbor. A small-craft basin is behind the ConRail fill 0.75 mile ENE of the courthouse clock tower.

(543) In the SE part of Sandusky Bay, a privately dredged and marked channel leads to a marina under construction in Pipe Creek. In 1983, the channel had a reported controlling depth of 3 feet. The highway bridge over the channel entrance has a 38-foot fixed span with a clearance of 21 feet. The channel is bordered on the W side by diked wetland areas.

(544) **Communications.**–Sandusky has good highway connections and is served by the Norfolk Southern Railroad and ConRail. A small airport is SE of the city. Three ferry services connect Sandusky with Cedar Point; Kelleys Island; and Pelee Island, Kingsville, Ont., and Leamington, Ont.

(545) **Charts 14830, 14844, 14842.**–**Sandusky Bay** extends W from its entrance between Cedar Point and Bay Point for about 15 miles to **Muddy Creek Bay. Sandusky River** flows into the S side of Muddy Creek Bay. Small craft can navigate through Sandusky Bay, Muddy Creek Bay, and upstream in the Sandusky River for about 15 miles to the Norfolk Southern Railway Bridge at the town of **Fremont, Ohio.** Depths of about 5 feet can be carried through Sandusky Bay, thence 2 to 4 feet through Muddy Creek Bay, and thence 2 to 19 feet in the river. The channels through the bays are indefinite and not marked. The entrances to Muddy Creek Bay and the Sandusky River are marked by uncharted buoys that are frequently moved to mark the best water. Small craft are cautioned to use the marked channel at the mouth of the river as submerged dikes extend from both sides of the river mouth.

(546) In May 1985, a submerged obstruction was reported in the midchannel at the mouth of the river in about 41°27′01″N., 82°59′57″W. In August 1987, a submerged obstruction was reported in the channel about 75 feet NW of Buoy 13 in about 41°26′59″N., 83°00′02″W.

(547) From **Martin Point,** about midlength of the S shore of Sandusky Bay, two bridges cross to Danbury, Ohio on the N shore. The east bridgeis the ConRail bridge. The main draw of the bridge is a bascule span with a clearance of 9 feet, and three fixed spans have a maximum clearance of 8½ feet. The bridge has been filled solid in various places, causing strong currents to flow through the openings; caution is advised. Caution is also advised because of piles that bare near the bridge. An overhead power cable W of the ConRail bridge has a clearance of 62 feet through the main navigation opening, which is marked by lights, and 32 feet through the other openings. The west bridge is the Ohio Route 2 highway bridge, a fixed span with a clearance of 43 feet. (See **33 CFR 117.1 through 117.59 and 117.853,** chapter 2, for drawbridge regulations.)

(548) The Ohio Turnpike I-80 and I-90 Bridge crossing the Sandusky River about 9 miles above the mouth has twin fixed spans with clearances of 40 feet. The Ohio Route 20 bridge about 13.5 miles above the mouth has a fixed span with a clearance of 53 feet. The Norfolk Southern Railway bridges that cross the river on either side of Bradys Island at the head of navigation at Fremont have fixed spans with clearances of 24 feet. Overhead cables crossing the navigable part of the river have a minimum clearance of 36 feet.

(549) A submerged breakwater off the S shore of Sandusky Bay 3.6 miles SW of Martin Point is marked by private lighted buoys. In July 1987, a sunken wreck was reported about 2 miles WNW of Martin Point in about 41°28′34″N., 82°51′57″W. A sunken wreck, covered ½ foot, is off the N shore of the bay 3.9 miles WNW of Martin Point.

(550) **Johnson Island,** in the NE corner of Sandusky Bay W of Bay Point, is connected to the N shore of the bay by a causeway having five openings. Each opening has a horizontal clearance of 50 feet with the center opening having a vertical clearance of 29 feet and each of the others 8 feet.

(551) From the Sandusky Harbor entrance channel N to Point Marblehead, there are several offlying shoal spots. **Bay Point Shoal,** with a least depth of 4 feet, is 1 mile E of Bay Point and is marked on the E side by a lighted buoy. A submerged rock is close to shore in about 41°31′13″N., 82°43′02″W. Shoal spots with depths of 22 to 24 feet are from 1.5 to 3 miles E of Point Marblehead and 1.7 to 2.7 miles N of Sandusky Harbor Breakwater Light.

(552) An unmarked **dumping ground** with a least reported depth of 30 feet is 3 miles E of Point Marblehead. Between Point

Marblehead and the dumping ground, S to the Sandusky Bay entrance, are numerous submerged fish net stakes.

(553) **Point Marblehead** (41°32.2′N., 82°42.7′W.), marked by a light, is the E extremity of the peninsula that encloses the N side of Sandusky Bay.

(554) About 1 mile WNW of Point Marblehead are the Marblehead Stone Docks, two piers owned and operated by Standard Slag Co., Marblehead Stone Division. The W pier extends 800 feet into the lake and has depths of 26 to 15 feet along the outer 500 feet of the W side with a deck height of 8 feet. A mobile shuttle loads limestone into vessels at a rate of 2,000 tons per hour. The E side of the W pier and the W side of the E pier are used for loading barges. A prominent overhead conveyor, lighted at night, extends from the piers inland to the quarry.

(555) **Marblehead Coast Guard Station** is close W of Marblehead Stone Docks. A small sheltered basin at the station has depths of 8 feet decreasing to 6 feet at the edges.

(556) Automobile and passenger ferry services to Kelleys Island are available from a dock just W of the Coast Guard station.

(557) **Catawba Island** (41°35.0′N., 82°50.5′W.), W of Point Marblehead, juts N from the peninsula on the N side of Sandusky Bay and terminates in **Scott Point. Mouse Island,** useful as a radar target, is a small island on the shoal bank about 0.2 mile N of Scott Point. In the bight between Point Marblehead and Mouse Island, the depths are 18 feet about 1.3 miles off and shoal toward shore. The bottom is rock and boulder strewn. **Middle Harbor Shoal,** with a least depth of 2 feet, is marked on the N side by a lighted buoy about 2.4 miles SE of Mouse Island. A shoal bank with depths of 9 feet is 1.8 miles SE of Mouse Island. Within the bight are the facilities at Lakeside, East Harbor, and West Harbor.

(558) A lighted microwave tower is prominent 2 to 3 miles offshore of Catawba Island.

(559) At **Lakeside, Ohio,** about 2.2 miles WNW of Point Marblehead, a dock extends offshore about 600 feet into depths of 10 feet. Several smaller docks to the W extend into lesser depths. Berths with electricity, gasoline, water, marine supplies, sewage pump-out, and hull and engine repairs are available for small craft.

(560) Marblehead-Lakeside is a **customs station.**

(561) **East Harbor,** 3.9 miles W of Point Marblehead, is a shallow bay with an entrance channel between two parallel piers marked on the outer ends by private lights. The N shore of the harbor is a State park and recreation area, and the waters in the harbor are a public fishing area and game refuge. Numerous small-craft facilities are on the S side of the bay and E of the entrance channel. In 1970, the controlling depth was 5 feet in the entrance channel and thence S and W to the facilities on the S side of the bay. The basin on the E side of the entrance had a controlling depth of 3 feet. Private buoys mark the channel through the harbor.

(562) **West Harbor** is entered 2.5 miles NW of East Harbor through two entrance channels. The SE entrance is protected by converging jetties marked at their outer ends by lights. A dredged channel, marked by lights, buoys, and daybeacons, leads through the jetties to the head of the harbor. In April-May 1998, the mid-channel controlling depths were 7 feet to the junction with the inner channel, thence 7 feet to the upstream limit of the Federal project. The NW entrance channel is privately maintained and leads to a large small-craft harbor. The entrance is protected by jetties marked by lights at their outer ends. In June 1993, the reported controlling depth was 5 feet with 3 to 6 feet in the harbor. A fixed highway bridge at the head of the harbor has a reported clearance of 20 feet. Beyond the bridge, a dredged channel leads SW through West Bay to join the channel from the SE entrance. In May 1998, the controlling depth was 6½ feet from the bridge SW through West Bay to the junction with the SE entrance channel. Boats drawing up to 3 feet can be accommodated at docks in the harbor. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, launching ramps and hoists to 35 tons are available.

(563) Just W of Scott Point is the mainland terminus of the automobile and passenger ferry line operating to the islands N of Catawba Island. A depth of about 11 feet is at the outer face of the dock. About 400 feet W of the ferry dock is a dock of the Port Clinton Fish Co., with depths of about 4 feet alongside. Catawba State Park is on the W side of Catawba Island. A light marks the outer end of the park pier.

(564) Just SE of the State park pier, a pier marked at the outer end by a private light protects the SW side of the entrance to a small-craft basin. The entrance channel has depths of about 5 feet with 5 feet at the berths on the W side of the harbor and 3 feet at the berths on the E side. Gasoline, diesel fuel, water, ice, electricity, marine supplies, and hoists to 40 tons for hull, engine, and minor electronic repairs are available.

(565) **Charts 14830, 14844, 14842, 14846.**–Between Catawba Island and **Locust Point** (41°36.2′N., 83°05.0′W.), a rounding projection 12 miles W, a broad open bight has depths less than 24 feet. The Portage River empties into the S side of the bight. A large shallow bank with depths less than 14 feet extends about 5.5 miles N and NE off Locust Point. A least depth of 2 feet, marked on the E side by a buoy, is about 4.7 miles NE of the point, and there are scattered patches of 3 to 10 feet elsewhere. **Niagara Reef,** a detached shoal with a least depth of 3 feet, is 6.8 miles NE of the point and is marked on the N side by a lighted buoy Strangers should not attempt passage S of Niagara Reef.

(566) **Port Clinton, Ohio,** is at the mouth of the **Portage River,** about 29 miles SE of Toledo Harbor entrance. The river enters the lake at the S end of the bight immediately W of Catawba Island. This bight is quite shoal, the depths ranging from 6 feet off the end of the piers to 18 feet about 3.3 miles from shore. A lighted relay tower in the city near the inner end of the entrance channel is prominent.

(567) **Channels.**–The harbor is entered through a dredged entrance channel leading from deep water in Lake Erie between two parallel piers upstream in Portage River for about 0.4 mile to the Monroe Street highway bridge. Lights mark the outer ends of the piers. In August 1996, the controlling depth in the entrance channel was 9 feet from Lake Erie to Monroe Street highway bridge except for shoaling to 5 feet along the N side near the entrance to Port Clinton Yacht Club and to 7 feet along the S side between Jefferson Street and the bridge. The channel lakeward of the piers is subject to shoaling.

(568) **Bridges.**–The Monroe Street highway bridge, 0.4 mile above the river mouth, has a bascule span with a clearance of 9 feet. An overhead cable 0.1 mile above the bridge has a clearance of 83 feet. The ConRail bridge 1.5 miles above the mouth has a roller-lift span with a clearance of 13 feet. (See **33 CFR 117.1 through 117.59 and 117.851,** chapter 2, for drawbridge regulations.) The State Route 2 bridge, 3 miles above the mouth, has a fixed span with a clearance of 30 feet.

(569) **Harbor regulations.**–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor by the city of Port Clinton.

(570) **Wharves.**–The S side of the Portage River has three commercial facilities. Parker Boat Line operates a ferry between Port Clinton and Put-In-Bay, Port Clinton Fisheries receives fish at a wharf W of the ferry dock, and the Port Clinton Lumber Co.

receives sand at a wharf on the W side of the Monroe Street bridge.

(571) **Small-craft facilities.**–Above the Monroe Street bridge, several marinas provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and marine supplies. Hoists to 45 tons and a 150-ton marine railway are available for hull, engine, and electronic repairs. A marina on the lakefront about 2 miles WNW of Port Clinton provides gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. A 20-ton hoist is available for hull and engine repairs.

(572) **Charts 14830, 14846.**–About 4 miles W of Port Clinton, a **danger zone** for small arms and artillery firing extends 6.5 miles NE, 10 miles N, and 12 miles NW from **Camp Perry.** (See **33 CFR 334.850,** chapter 2, for limits and regulations.) A jetty extends from the shore at Camp Perry to a pier about 1,000 feet offshore.

(573) **Toussaint River** is entered about 8 miles NW of Port Clinton on the E side of Locust Point. The entrance channel is marked by buoys and the river is marked by private buoys. A shoal is immediately N of the entrance channel. In July 1981, the reported controlling depth was 4½ feet from deep water in the lake through the entrance, and thence upstream to the marina about 1.6 miles above the mouth. An overhead power cable with a reported clearance of 65 feet crosses the river about 1.4 miles above the mouth. Transient berths, gasoline, water, ice, sewage pump-out facilities, and launching ramps are available.

(574) The cooling tower of the Davis-Besse Nuclear Power Station is prominent NW of the mouth of the Toussaint River.

(575) Between Locust Point and **Cedar Point,** 15 miles NW, the 18-foot contour decreases from about 7 miles offshore at Locust Point to 2.5 miles at Reno Beach and then increases to 4.5 miles at Cedar Point. Several isolated 17-foot spots are beyond the 18-foot contour NE of Cedar Point.

(576) **Long Beach,** a private harbor for small boats, is on the N side of Locust Point. A private **159°** lighted range marks the entrance to the basin.

(577) **Turtle Creek,** about 2.5 miles W of Locust Point, has two marinas at its mouth. In 1977, the reported controlling depth in the mouth of the creek was 1 to 2 feet. The entrance is marked by a private **129°** lighted range and buoys. Numerous submerged piles are in the mouth of the creek. Caution is advised. Transient berths, gasoline, water, ice, launching ramps, and a 60-ton hoist are available.

(578) A highway bridge with a reported clearance of 10 feet crosses Turtle Creek just inside the entrance.

(579) **Ward Canal** is entered about 6 miles WNW of Turtle Creek. Two jetties protect the entrance channel. A light marks the outer end of the E jetty. In May 1981, a sandbar was reported across the mouth of the canal. Caution is advised. Small-craft facilities are available in the canal.

(580) **Cooley Creek** is entered 2.9 miles NW of Ward Canal. The breakwaters that protect the entrance channel are marked at the outer ends by private lights. Facilities in the creek provide transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, and launching ramps. Hoists to 75 tons are available for hull and engine repairs.

(581) **Charts 14830, 14846, 14847.–Maumee Bay** is a large shallow expanse forming the SW corner of Lake Erie. The bay has prevailing depths of less than 10 feet and is obstructed by several dumping grounds. A dredged channel leads from deep water in Lake Erie SW through the bay to the mouth of the Maumee River.

(582) **Toledo Harbor,** serving the city of **Toledo, Ohio,** is at the W extremity of Lake Erie. The harbor includes the lower 7 miles of the **Maumee River** and a channel about 18 miles long through Maumee Bay from deep water in Lake Erie to the mouth of the river. The principal cargoes handled at the port are coal, iron ore, grain, petroleum products, and general cargo.

(583) **Prominent features.**–The TV towers S to SW of Cedar Point and the stacks of the Consumers Power Company 6.6 miles WNW of Toledo Harbor Light are conspicuous in the approach to the harbor.

(584) **Toledo Harbor Light** (41°45.7′N., 83°19.7′W.), 72 feet above the water, is shown from a square brick buff-colored dwelling with an attached fog-signal house on the NW side of the entrance channel about 8.5 miles NE of the river mouth. A fog signal is at the light. Maumee Bay Entrance Light 2, about 8 miles NE of Toledo Harbor Light, is equipped with a radar transponder (Racon) and a fog signal.

(585) **Channels.**–A dredged entrance channel, marked by buoys, lights, and a **237¼°** lighted range, leads SW for about 18 miles from deep water in Lake Erie through the shallow water of Maumee Bay to the mouth of Maumee River, thence upstream for about 7 miles. Maumee Mooring Basin is on the NW side of the channel at the mouth of the river, and turning basins are 2.7, 6.3, and 7 miles above the mouth.

(586) The Federal project depths are 28 feet from deep water in the lake through the entrance channel to the mouth of the river and in Maumee Mooring Basin; thence 27 feet in the river channel to the upstream limit of the project with 20 feet in Riverside Turning Basin, 2.7 miles above the mouth; thence 27 feet in the turning basin 6.3 miles above the mouth; and thence 18 feet in the turning basin at the head of the project, 7 miles above the mouth. (See Notice to Mariners and latest edition of charts for controlling depths.)

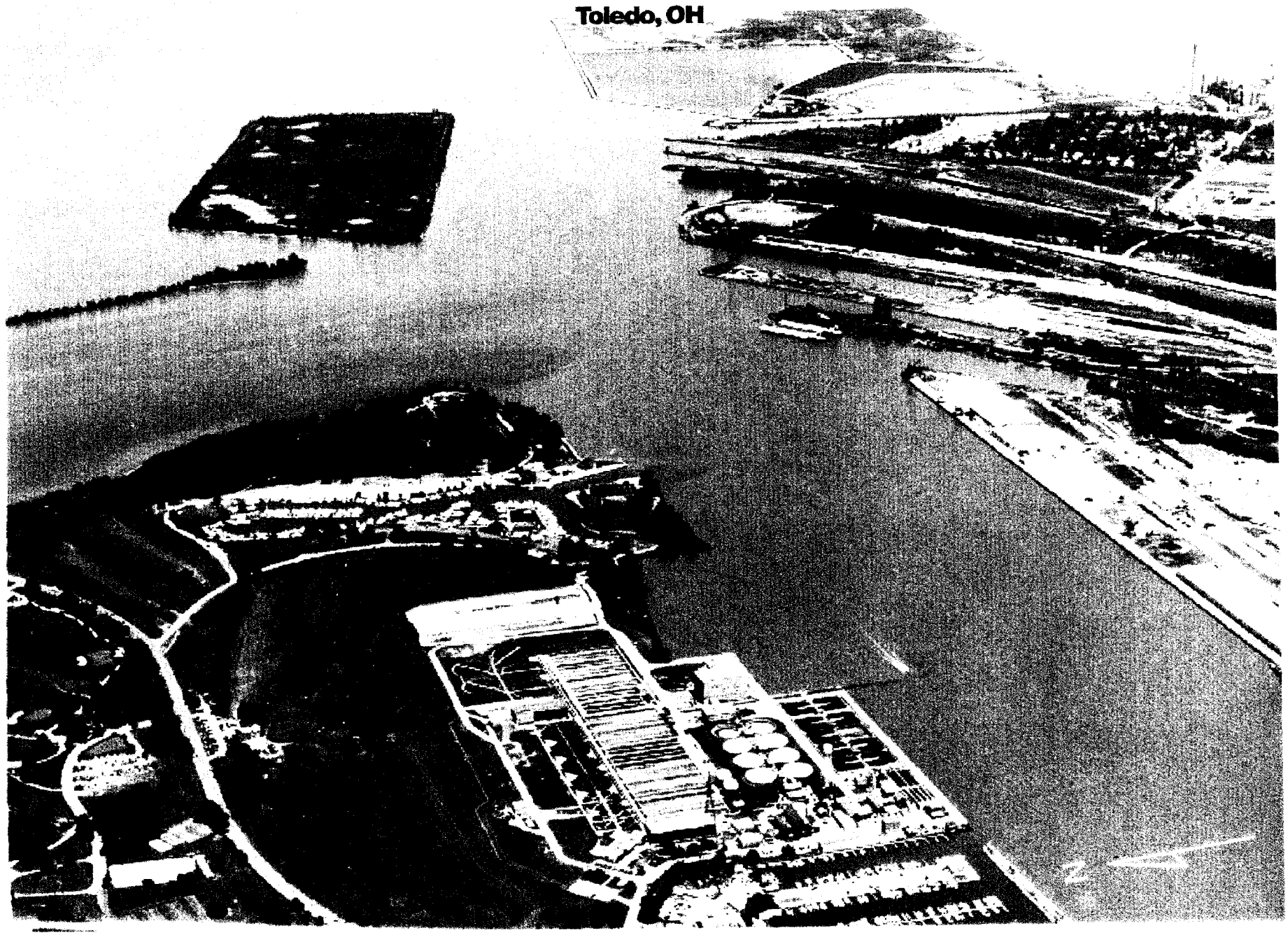
(587) No distinct bars form in the dredged channel, which is, however, subject to considerable fill along its sides each year. Depths in Maumee Bay outside of the improved channel are less than 10 feet, and navigation is possible for small boats only. In the lake, dredge operations have thrown up a ridge of earth along the edges of the channel. This ridge may rise as much as 3 feet above the natural lake bottom. In order to avoid the ridges, deep-draft vessels should pass **Safe Water Lighted Buoy** (41°50.1′N., 83°10.1′W.) close aboard and enter the entrance channel between the outermost lakeward buoys.

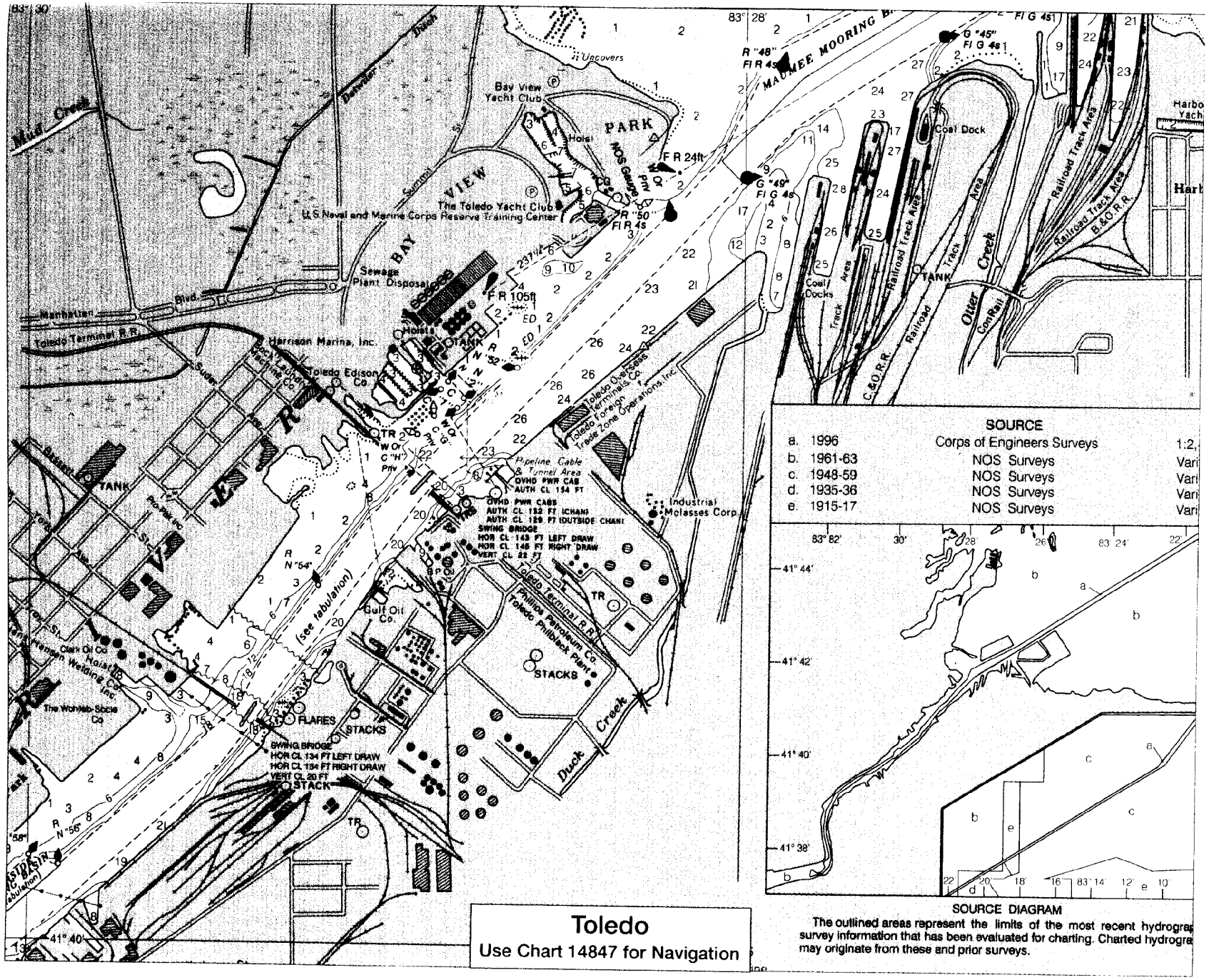
(588) A diked disposal area is on the SE side of the entrance channel at the mouth of the Maumee River. The disposal area, about 242 acres, extends about 0.9 mile into the bay from the shore. A turning area and pump-out platform marked by lights, are on the NW side of the disposal area.

(589) Upstream of the dredged channel in the Maumee River, the channels are irregular and of uncertain depths, with numerous shoals and rock bars. Boats with local knowledge drawing less than 5 feet can usually pass as far as **Perrysburg, Ohio,** about 7 miles above Toledo.

(590) **Local bridge regulations.**–Section 22-4-1.

(591) 4. No bridge owners shall obstruct, or permit or cause to be obstructed the passage of any vessels by permitting trucks, automobiles, railroad cars, locomotives or other obstructions to remain upon or across their moveable bridge for longer than fifteen (15) minutes to the hindrance or inconvenience of vessels signaling to pass through any such bridge. No bridge owner shall fail, at the end of each fifteen (15) minute period of obstruction of ves-


Toledo, OH




**SOURCE**

| | | | |
|---|---|---|---|
| a. | 1996 | Corps of Engineers Surveys | 1:2, |
| b. | 1961-63 | NOS Surveys | Vari |
| c. | 1948-59 | NOS Surveys | Vari |
| d. | 1935-36 | NOS Surveys | Vari |
| e. | 1915-17 | NOS Surveys | Vari |

**SOURCE DIAGRAM**

The outlined areas represent the limits of the most recent hydrogra survey information that has been evaluated for charting. Charted hydrogra may originate from these and prior surveys.

# Toledo

Use Chart 14847 for Navigation

## Structures across Maumee River at Toledo
### *Miles above the mouth of the river
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 1 | Overhead cable | Power | 0.92 | | | | 154 | |
| 2 | Overhead cable | Power | 1.03 | | | | 129 | 132 feet over channel. |
| 3 | Overhead cable | Power | 1.06 | | | | 146 | |
| 4 | Toledo Terminal RR bridge | Railroad | 1.07 | 143 | 145 | | 22 | Swing. |
| 5 | Norfolk Southern RR bridge | Railroad | 1.80 | 145 | 136 | | 20 | Swing. |
| 7 | Craig Memorial Bridge | Highway | 3.30 | | | 200 | 38 | Bascule. 44 feet at center. |
| 8 | Overhead cable | Power | 4.06 | | | | 140 | |
| 9 | Martin Luther King, Jr. Memorial Bridge | Highway | 4.30 | | | 200 | 21 | Bascule. 31 feet at center. |
| 10 | Anthony Wayne Bridge | Highway | 5.16 | | | 747 | 104 | Fixed. Note 1. |
| 11 | ConRail bridge | Railroad | 5.76 | 115 | 115 | | 17 | Swing. |
| 12 | Overhead cable | Power | 5.76 | | | | 105 | |
| 13 | Michael DiSalle Bridge | Highway | 6.73 | 110 | 110 | | 45 | Fixed. |
| 14 | Toledo Terminal RR bridge | Railroad | 11.38 | 110 | 110 | | 53 | Swing. |
| 15 | Overhead cable | Power | 11.40 | | | | 110 | |
| 16 | Ohio Turnpike bridges | Highway | 11.42 | 110 | 110 | | 37 | Twin fixed. |
| 17 | Perrysburg-Maumee Bridge | Highway | 14.72 | 100 | 100 | | 29 | |

See **33 CFR 117.1 through 117.59 and 117.855,** chapter 2, for drawbridge regulations.

Note 1.—Bridge has a vertical clearance of 108 feet (32.9 meters) on the centerline, decreasing to 104 feet (31.7 meters) at the channel limits and 97 feet (29.6 meters) at the harbor lines.

sel passage, to cause such trucks, automobiles, railroad cars, locomotives or other obstructions to be removed for sufficient time to allow passage of all such vessels.

(592) This section does not apply to obstruction of vessel passage caused by a continuously moving through train or by circumstances wholly beyond the control of the bridge owner, but applies to other obstructions, including without limitation, those caused by pavement or track maintenance, stopped trains or trains engaged in switching, loading, unloading or shift change.

(593) Upon the filing of an affidavit or complaint for violation of this section, summons shall be issued to the bridge owner, which summons shall be served on the owner or the agent of the owner within the city of Toledo.

(594) Section 22–4–2. Vessels Approaching Bridges. It shall be unlawful for any master or person in charge or in possession of any vessel navigating the harbor to approach any nearer to any of the bridges than to a point at a distance from such bridge within which such vessel can be stopped without colliding with such bridge unless he has received the approval signal of one long and one short blast.

(595) Section 22–4–3. Bridges To Be Lighted. All bridges over the Maumee River in the city of Toledo shall be lighted in accordance with the regulations of the United States Coast Guard and lights shall be visible on a dark night with clear atmosphere at least one nautical mile or about 2,000 yards.

(596) Section 22–4–4. Vessels Passing Through Bridges. All vessels navigating the harbor when passing any bridge shall be moved as expeditiously as is consistent with a proper movement in the river and shall not be anchored or fastened to interfere with the opening or closing of any bridge.

(597) Section 22–4–5. One Vessel Tow. It shall be unlawful for any person to cause any vessel to tow more than one vessel at a time through any movable bridge in the harbor, providing that this shall not be construed as applying to scows or yachts.

(598) Section 22–4–6. Passing on After Signal To Open. When any bridge operator shall be about to open the span of any bridge within the limits of the city he shall give notice to land traffic of his intention to open such movable span by raising a flag, ringing a bell, or other signal or flashing a red light. After such notice is given, no person shall walk, ride or drive any vehicle upon such movable span while such bridge operator is opening or closing the same.

(599) Section 22–4–9. Duty of Bridge Operators. It shall be the duty of the bridge operator in all cases to report to his immediate superior any infraction of this article.

(600) Section 22–4–10. Penalty. Any master, owner or person in possession, charge or control of any vessel, any owner or operator responsible for operation of a moveable bridge or any other person, firm or corporation who shall violate any of the provisions of this article shall be deemed guilty of a misdemeanor of the fourth

degree as set forth and provided for in Section 17–1–111 in the case of an individual and Section 17–1–113 as to organizations.

(601) **Fluctuations of water level.**–In addition to the fluctuations that affect Lake Erie somewhat uniformly, sudden abnormal changes due to wind frequently occur at this port. The observed wind-produced fluctuations, in combination with prevailing high or low water, range between extremes of 8 feet above and 7 feet below Low Water Datum. NE winds can increase water levels as quickly as 2 feet in 1 hour. Ice jams near the mouth of Maumee River have raised the water in the river as high as 12 feet above Low Water Datum.

(602) Mariners are cautioned that when water levels are above Low Water Datum, bridge clearances are correspondingly reduced. The Toledo-Lucas County Port Authority, telephone, 419–243–8251, will measure the height of masts upon request.

(603) A National Ocean Service water level gage house is near the W shoreline of the river adjacent to the Toledo Coast Guard Station. A submerged intake pipe extends about 300 feet riverward from the gage house. Mariners should avoid all movement of deep-draft vessels or the dragging of anchors in the vicinity of the water intake pipe.

(604) Upon request, the Toledo Coast Guard Station will broadcast water level information in the following format:

(605) "This is the U.S. Coast Guard Toledo Station. The National Ocean Service water level gage at this station now reads plus/minus inches above/below Low Water Datum. This is the U.S. Coast Guard Toledo Station. Out."

(606) **Currents.**–The current in the Maumee River is about 1 mph.

(607) The Coast Guard reported a hazardous condition in 1994 at the ConRail bridge at mile 5.76. Currents in excess of 2 knots were reported in the restricted channel at the bridge following heavy rains. The current appears to deflect off the east river bank causing a sheer towards the west bank. Caution is advised when transiting this area.

(608) **Weather, Toledo and vicinity.**–Toledo, OH, located on the extreme southwest shore of Lake Erie and in the north-central part of the state, averages about 15 days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 84°F (28.9°C) and an average minimum of 61°F (16.1°C). January is the coolest month with an average high of 31°F (-0.6°C) and an average minimum of 16°F (-8.9°C). The highest temperature on record for Toledo is 104°F (40°C) recorded in July 1995 and the lowest temperature on record is -20°F (-28.9°C) recorded in January 1984. About 140 days each year sees temperatures below 32°F (0°C) and an average 16 days each year records temperatures below 5°F (-15°C). Every month has seen temperatures at or below 40°F (4.4°C) and every month except July and August has recorded temperatures below freezing (0°C).

(609) The average annual precipitation for Toledo is 32.4 inches (823 mm) which is fairly evenly distributed throughout the year. Precipitation falls on about 205 days each year. The wettest month is June with 3.6 inches (91 mm) and the driest, February, averages only 1.7 inches (43 mm). An average of 38 thunderstorm days occur each year with June and July being the most likely months. Snow falls on about 78 days each year and averages about 37 inches (940 mm) each year. December through February each average greater than eight inches (203 mm) per year while January averages 10 inches (254 mm). Greater than ten inch (254 mm) snowfalls in a 24-hour period have occurred in December and January and 14 inches (356 mm) fell in one 24-hour period during December 1974. About eight days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June, July, and August. Fog is present on average 162 days each year and is evenly distributed throughout the year with a slight maximum in August and September.

(610) The prevailing wind direction in Toledo is the west-southwest. The winter months are the windiest period however a peak gust of 65 knots occurred in August 1988.

(611) (See page T-6 for **Toledo climatological table.**)

(612) **Towage.**–Tugs to 2,200 and 1,400 hp are available from Gaelic Tugboat Co. or Great Lakes Towing Co., respectively. Arrangements for tugs are made through the companies' dispatchers at 419-243-8972 or 800-621-4330, respectively. Great Lakes Towing Co. has VHF-FM capability for tug arrangements.

(613) At least 2 hours advance notice is requested. Vessels proceeding upstream to the grain elevators near the head of the Federal project usually require the assistance of tugs, but vessels proceeding to the general cargo wharves below the bridges generally do not require assistance.

(614) Toledo is a **customs port of entry.**

(615) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(616) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(617) **Coast Guard.**–A Coast Guard **Marine Safety Office** is at Toledo. (See appendix for address.) Toledo Coast Guard Station is on the NW side of the mouth of the Maumee River.

(618) **Harbor regulations.**–Speed in harbor. In Maumee Bay, lakeward of Maumee River Lighted Buoy 49, no vessel greater than 100 feet long shall exceed 12 mph (10.4 knots). No person shall operate any vessel over 40 feet long in the harbor at a speed greater than 6 mph (5.2 knots). Vessels greater than 100 feet long shall not overtake another vessel in the harbor. (See **33 CFR 162.150,** chapter 2, for speed limits and regulations.)

(619) Copies of the harbor regulations may be obtained from City of Toledo, Division of Streets, Bridges and Harbor, 1189 West Central Avenue, Toledo, Ohio 43610.

(620) **Harbor Patrol.**–The Toledo Harbor Patrol maintains an office adjacent to the Coast Guard station.

(621) **Wharves.**–Toledo has numerous facilities along both sides of the Maumee River. Only the deep-draft facilities are described. (For complete information on the port facilities, refer to Port Series No. 44, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The depths alongside for the facilities described are reported depths. (For the latest depths, contact the operator.) All the facilities described have highway connections, and most have railway connections. Water and electrical shore-power connections are available at many of the piers, wharves, and docks. General cargo at the port is generally handled by ships' tackle. Specialized equipment is described under the individual facility. Many of the harbor facilities are used for mooring of vessels during the closed navigation season.

(622) **Facilities on the E side of the river:**

(623) **Lakefront Pellet Terminal Dock:** (41°42′00″N., 83°26′54″W.); 2,105-foot face; 27 feet alongside; deck height, 10 feet; open storage for 923,000 tons of material; receipt of iron ore pellets; owned by CSX Transportation, Inc. and ConRail; operated by Toledo Ore Railroad Co.

(624) **Toledo Docks, Pier No. 3:** (41°42′00″N., 83°27′06″W.); 1,202-foot E face; 1,054-foot W face; 27 feet alongside; deck height, 10 feet; four hulett-type ore unloaders; receipt of iron ore;

owned by CSX Transportation, Inc. and ConRail; operated by Chessie System-Toledo Docks.

(625) **Toledo Docks, Ore and Coal Dock:** (41°41′40″N., 83°27′34″W.); 1,760 feet of berthing space; 27 feet alongside; deck height, 12 feet; one traveling coal loading tower, rate 6,000 tons per hour; receipt of iron ore, shipment of coal and petroleum coke; bunkering vessels; owned by Toledo-Lucas County Port Authority and operated by Chessie System-Toledo Docks.

(626) **Toledo Docks, Middle Pier:** across slip W of Toledo Docks, Ore and Coal Dock; 1,398-foot E face; 1,993 feet of berthing space along W side; 27 feet alongside; deck height, 12 feet; one car dumper on each side of pier; shipment of coal and occasional shipment of coke, limestone, and ore; bunkering vessels; owned by Toledo-Lucas County Port Authority and operated by Chessie System-Toledo Docks.

(627) **Toledo Docks, West Pier:** across slip W of Toledo Docks, Middle Pier; 1,123-foot E face; 27 feet alongside; deck height, 12 feet; one car dumper; shipment of coal and petroleum coke; bunkering vessels; owned by Toledo-Lucas County Port Authority and operated by Chessie System-Toledo Docks.

(628) **Toledo-Lucas County Port Authority Facility No. 1 Wharf:** (41°41′14″N., 83°28′21″W.); 4,196-foot face; 27 feet alongside; deck height, 11 feet; 122,000 square feet covered storage; 90 acres open storage; tank storage for 8 million gallons; six traveling gantry cranes to 110 tons; receipt and shipment of general and containerized cargo and miscellaneous bulk materials; receipt of molasses and liquid fertilizer; owned by Toledo-Lucas County Port Authority and operated by Toledo-Lucas County Port Authority and Toledo World Terminal, Inc.

(629) **Ashland Petroleum Co., Toledo Terminal Dock:** 500 feet above Toledo Terminal Railroad bridge; 252 feet of berthing space with dolphins; 20 feet alongside; deck height, 6 feet; pipelines extend to tank storage, capacity 320,000 barrels; receipt and shipment of petroleum products, toluene, xylene, and solvents; owned by Texby, Inc. and operated by Ashland Petroleum Co.

(630) **British Petroleum, Marine Dock:** 800 feet above Toledo Terminal Railroad bridge; 257-foot face; 21 feet alongside; deck height, 7½ feet; pipelines extend to tank storage, capacity over 1 million barrels; shipment and occasional receipt of petroleum products; owned by Norfolk Southern Railway Co. and operated by British Petroleum.

(631) **Sun Petroleum Products Co. Maumee River Wharf:** 100 feet below Craig Memorial Bridge; 918 feet of berthing space; 18 to 27 feet alongside; deck height, 12 feet; tank storage for about 2½ million barrels; shipment of fuel oil and benzene; owned and operated by Sun Petroleum Products Co.

(632) **City of Toledo, Division of Streets, Bridges, and Harbor Wharf:** 0.3 mile above Cherry Street bridge; 1,044 feet of berthing space; 25 feet alongside; deck height, 10 feet; 40-ton derrick; 25-ton crane; 45,000 square feet of open storage; receipt of salt; owned and operated by city of Toledo.

(633) **Countrymark Cooperative, Inc.:** 1 mile above Anthony Wayne Bridge; 1,790 feet of berthing space; 27 feet alongside; deck height, 10 feet; 10 vessel-loading spouts, total loading rate 55,000 bushels per hour; three independent vessel-loading spouts, combined rate 80,000 bushels per hour; 10 million-bushel grain elevator; shipment of grain; owned and operated by Countrymark Cooperative, Inc.

(634) **Facilities on the W side of the river:**

(635) **Clark Petroleum Wharf:** immediately above Norfolk Southern Railway bridge; 403-foot SW face; 20 feet alongside; deck height, 10 feet; tank storage for 216,000 barrels; receipt and shipment of petroleum products; owned and operated by Clark Petroleum.

(636) **Consolidated Dock:** immediately below Craig Memorial Bridge; 1,640-foot face, 16 to 28 feet alongside; deck height, 12 feet; cranes to 100 tons; covered storage for 75,000 tons of material; open storage for 500,000 tons of material; receipt of miscellaneous bulk materials; owned by Wills Trucking, Inc., and operated by Consolidated Dock, Inc.

(637) **Toledo Harbor Warehousing Corp. Wharf:** immediately above Craig Memorial Bridge; 750 feet of berthing space; 20 feet alongside; deck height, 10 feet; 25,000 square feet covered storage; receipt of newsprint; owned by ConRail and operated by Toledo Harbor Warehousing Corp.

(638) **Kuhlman Corp. Wharf:** 0.4 mile above Craig Memorial Bridge; 1,280-foot face; 12 feet alongside; deck height, 10 feet; open storage for 217,000 tons of material; receipt of sand, stone, and salt; owned and operated by Kuhlman Corp.

(639) **LaFarge Corp. Toledo Terminal Wharf:** immediately below Martin Lurther King, Jr. Memorial Bridge; 782 feet of berthing space; 18 to 22 feet alongside; deck height, 8 feet; receipt of bulk cement; owned and operated by LaFarge Corp.

(640) **The Andersons Grain Wharf:** 0.7 mile above Anthony Wayne Bridge; 1,030-foot face; 27 feet alongside; deck height, 9 and 15 feet; six vessel-loading spouts, total loading rate 50,000 bushels per hour; 7-million-bushel grain elevator; shipment of grain, receipt of fertilizer materials; owned and operated by The Andersons.

(641) **Kuhlman Corp., Yard No. 1 Dock:** 0.9 mile above Anthony Wayne Bridge; 265-foot face; 18 feet alongside; deck height, 6 feet; open storage for 100,000 tons of material; receipt of sand and gravel; owned and operated by Kuhlman Corp.

(642) **Cargill, Toledo Elevator Dock:** immediately below Michael DiSalle Bridge; 590 feet of berthing space with dolphins; 30,000-bushel-per-hour vessel-loading spout; 6.1-million-bushel grain elevator; shipment of grain; owned and operated by Cargill, Inc.

(643) **Supplies.**–All types of marine supplies and provisions are available at Toledo. Water can be obtained at most berths. Bunker fuel is available by barge at most berths, by pipeline at refinery landings, and by truck at some wharves.

(644) **Repairs.**–All types of above- and below-the-waterline repairs to hulls, boilers, engine and deck machinery, and electronic equipment can be made in the harbor. Toledo Shipyard has two drydocks on the E side of the river about 2.5 miles above the mouth. The largest has a length of 800 feet with widths of 100 feet at the top and 83 feet at the keel blocks. The depth over the sill is 14 feet. Hans Hansen Welding Co., on the W side of the river 2 miles above the mouth, has a 50-ton hoist that can handle 75-foot vessels. Merce Boiler and Welding Co. performs repairs to vessels at their berths.

(645) **Small-craft facilities.**–Several marinas at Toledo provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. A 40-ton hoist is available for hull and engine repairs.

(646) **Communications.**–Toledo is served by nine railroad lines and has good highway connections. Several airports are near the city.

(647) **Ottawa River** empties into Lake Erie about 3.5 miles N of the mouth of the Maumee River. The river is used by small boats drawing 2 to 4 feet. In May 1980, a submerged obstruction was reported in the approach to the river in about 41°44.5′N., 83°27.3′W. Fred C. Young fixed highway bridge about 2 miles above the mouth has a clearance of 14 feet. Several marinas on the

river provide gasoline, water, electricity, sewage pump-out, launching ramps, marine supplies, and hoists to 20 tons for hull and engine repairs. A **slow-no wake speed** is enforced on the river.

(648) **Shantee Creek** and **Halfway Creek** empty into Lake Erie just N of the mouth of Ottawa River. A **slow-no wake speed** is enforced on both creeks.

(649) **Charts 14830, 14846.**–From **North Cape,** on the N side of Maumee Bay, N to the mouth of the River Raisin, the shore is low and wooded. The 18-foot contour varies from 9 miles offshore at Toledo to 3 miles offshore at Monroe. The **State boundary** between Ohio and Michigan is about 2.5 miles N of the mouth of the Maumee River.

(650) **Toledo Beach** is a small-craft harbor about 6.3 miles NW of Toledo Harbor Light. The entrance channel is marked by a private **290°** lighted range, and the ends of the breakwaters are marked by private lights. In 1977, depths of 6 feet were reported in the entrance channel. Facilities in the harbor provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, some marine supplies, and a launching ramp. A 35-ton hoist can handle 60-foot vessels for hull and engine repairs.

(651) **Otter Creek,** 1.3 miles N of Toledo Beach, has a small-craft harbor inside the mouth. The entrance channel to the creek is 25 to 30 feet wide between two short piers. Two private lights on the S pier form a **284°** range for approaching the creek. Depths in the approach and creek are 2 to 3 feet. In March 1985, shoaling to an unknown extent was reported about 200 feet, 095° from the front range light. Gasoline, water, ice, sewage pump-out facilities, and some marine supplies. A hoist can handle 38-foot vessels for hull and engine repairs.

(652) **Bolles Harbor, Mich.,** is a small-craft harbor at the mouth of **La Plaisance Creek,** about 2.7 miles SW of the mouth of the River Raisin. Gasoline, water, electricity, haul-out facilities, and launching ramps are available.

(653) **Channels.**–A dredged entrance channel leads NW from Lake Erie through **La Plaisance Bay** to the mouth of La Plaisance Creek, thence upstream for about 0.8 mile. A jetty is on the W side of the mouth and a diked disposal area extends about 1,700 feet lakeward from the E side of the mouth. The entrance channel is marked by a **341.5°** lighted range, buoys, a daybeacon, and a light, and the outer end of the jetty and dike are marked by lights. In April 1997, the controlling depths were 4½ feet (7½ feet at midchannel) to the mouth of the creek, thence 3½ feet (4 feet at midchannel) to the Harbor Marine docks, thence 3 feet to E.J. Miller Boat Livery, and thence about 1 foot to the head of the project.

(654) A diked disposal area enclosing the berm is on the E side of the entrance channel.

(655) A **slow-no wake speed** is enforced in La Plaisance Creek. A marina developed by the Michigan State Waterways Commission is in the harbor basin. Marinas in the creek provide transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, marine supplies, and launching ramps. A 20-ton hoist can handle 50-foot vessels for hull and engine repairs.

(656) **Monroe Harbor** is within the mouth of the **River Raisin,** which flows into the W end of Lake Erie about 15 miles NNE of the mouth of the Maumee River. Two 816-foot lighted stacks are prominent near the mouth of the River Raisin.

(657) **Channels.**–A dredged entrance channel leads from the deep water in Lake Erie to the mouth of the River Raisin, thence to a turning basin with its upper end 1.5 miles above the mouth. The entrance channel is marked by buoys and a **291°8′** lighted range. In July-August 1997, the controlling depth was 12 feet (15 feet at midchannel) in the entrance channel to the turning basin; thence in April 1997, 7½ to 16 feet in the basin; thence in 1993-September 1994, 11 feet to about 100 feet below the head of the project. The channels in this harbor are subject to extensive shoaling from waterborne silt and littoral drift from Lake Erie.

(658) **Bridges.**–Two overhead power cables with a minimum clearance of 160 feet cross the River Raisin 0.75 mile above the mouth. Another cable, with a clearance of 60 feet, crosses the river about 1.7 miles above the mouth. The Detroit-Toledo Freeway bridge 2.1 miles above the mouth has a fixed span with a clearance of 23 feet.

(659) **Harbor regulations.**–A **speed limit** of 10 mph (8.7 knots) is enforced in the entrance channel and 6 mph (5.2 knots) in the river channel. (See **33 CFR 162.145,** chapter 2, for regulations.)

(660) **Towage.**–Tugs for Monroe Harbor are available from Detroit. (See Towage under Detroit.)

(661) **Wharves.**–Monroe Harbor has three deep-draft facilities. (For a complete description of the port facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. For information on the latest depths, contact the operators.

(662) **Detroit Edison Co., Monroe Plant Wharf:** S side of the mouth of the river; 1,550-foot face; 21 feet alongside; deck height, 12 to 15 feet; open storage for 2 million tons of coal; receipt of coal; owned and operated by Detroit Edison Co.

(663) **Ford Motor Co. Monroe Plant Wharf:** N side of the river 1 mile above the mouth; 600 feet of berthing space along natural bank; 21 feet alongside; open storage for 20,000 tons of coal; receipt of coal; owned and operated by Ford Motor Co.

(664) **Port of Monroe**

(665) **General and Bulk Cargo and Dundee Cement Coke Docks:** SE side of the turning basin, 1,400 feet of berthing space 18 feet alongside, deck height, 6 feet; two berths along S side of river below turning basin, 600- and 650-foot faces, 20 feet alongside; 32,000 square feet covered storage; 28 acres open storage; receipt of dry bulk cargoes, petroleum coke, and coal; owned and operated by the Monroe Port Commission and Dundee Cement Co.

(666) **Small-craft facilities.**–A marina is just W of the Detroit-Toledo Freeway bridge (I-75) on the N side of the river. Transient berths, gasoline, water, electricity, sewage pump-out and marine supplies are available. Diesel fuel can be brought in by truck. Two forklifts and a 15-ton travel lift are available for hull and engine repairs and haul-out. A public boat launch ramp is on the S side of the river behind **SterlingIsland.**

(667) From the mouth of the River Raisin, the shoreline trends N about 4 miles and then E about 2 miles to **Stony Point,** a narrow peninsula extending about 0.5 mile S into the lake. **Brest Bay** is the bight formed on the W side of the point. A wreck covered 17 feet is 1.9 miles SSE of Stony Point. In August 1982, a dangerous sunken wreck was reported about 1.5 miles SW of Stony Point in about 41°55.0′N., 83°17.0′W.

(668) At **Sandy Creek,** about 2 miles N of Monroe Harbor, on the W side of Brest Bay, is a small-boat harbor. Sterling State Park is on the S side at the entrance to the creek; berths with electricity and a launching ramp are at the park. Private buoys mark the entrance channel. In 1977, depths of 3 to 4 feet were reported in the entrance with 4 feet alongside the piers. Shoaling was reported on the S side of the entrance. In May 1981, severe shoaling was reported in the approach to the creek. Transient berths, gasoline, water, ice, and electricity are available inside the creek.

(669) **Stony Creek** empties into the N side of Brest Bay. Spoil banks that extend SE from the mouth of the creek protect the entrance channel to the creek. Piles mark the channel between the spoil banks. Submerged rocks are close S of the channel. In 1977, it was reported that a submerged pipeline, covered 1 foot, crosses the entrance to the creek, limiting the harbor to small craft. A marina inside the creek mouth provides gasoline, ice, some marine supplies, and a launching ramp. A 3-ton lift is available for hull and engine repairs.

(670) On the E side of Stony Point, the 18-foot curve is about 0.6 mile offshore, increasing to 3.8 miles off at Swan Creek. From Swan Creek to **Pointe Mouillee,** on the W side of the mouth of the Detroit River, depths are generally less than 18 feet except for the dredged channels leading to the Detroit River.

(671) The water intake channel of the Enrico Fermi Power Plant is 2 miles N of Stony Point. Private lights mark the dikes on either side of the channel. Two 403-foot cooling towers at the plant are prominent.

(672) **Swan Creek** is about 3 miles N of Stony Point. The entrance to the creek is marked by private lights and daybeacons. Inside the entrance, piles mark the N limit of the channel. In 1977, a controlling depth of 2 feet was reported in the entrance channel. In December 1985, an obstruction was reported in the entrance channel about 200 feet NW of Daybeacon 4. A **slow-no wake speed** is enforced in the creek. Transient berths, gasoline, water, ice, electricity, sewage pump-out facilities, limited marine supplies, a 10-ton lift, and hull and engine repairs are available.

(673) **Charts 14830, 14848, 14849.–Detroit River Light** (42°00.0′N., 83°08.5′W.), 55 feet above the water, is shown from a white conical tower, upper part black, on a hexagonal pier in the entrance to the Detroit River E of Pointe Mouillee. A fog signal and racon are at the light.

(674) An irregularly shaped diked disposal area is about 2.5 miles W of Detroit River Light. A dredged channel, marked by buoys, leads W from the light to the disposal area, but is not intended for public use.

(675) **Charts 14820, 14830.**–For about 25 miles W from a line between Point Marblehead on the S shore and Point Pelee on the N shore, Lake Erie is rendered foul by a group of islands and shoals. The main route for large vessels is through Pelee Passage in the N part of the area, but other passages of limited capacity are also available to the S. Submerged fish net stakes may be encountered throughout the W end of Lake Erie.

(676) The **International boundary** between the United States and Canada extends through this area in a series of straight lines bearing from the E into the NW.

(677) **Charts 14830, 14844, 14842.–South Passage** extends along the S shore of Lake Erie, bounded by Point Marblehead and Catawba Island on the S and Kelleys Island, South Bass Island, and Green Island on the N. Although it is obstructed by numerous shoals, a depth of 16 feet can be carried through the passage.

(678) **Kelleys Island** is about 4 miles N of Point Marblehead with a deep channel 2.7 miles wide between. The island, about 3 miles long E and W and about 2 miles wide N and S, is bordered on the E side by a rocky bank that extends 0.7 mile off. A buoy marks the extent of the bank E of **Long Point,** the NE point of the island. The other shores of the island should not be approached closer than 0.25 mile except at the landings. W of Long Point, an open bay has depths of 18 feet to within 0.4 mile of the shore. A dangerous sunken wreck is 0.4 mile W of Long Point. Kellstone, Inc. has a dock on the W side of the island, and a ferry dock with service to Marblehead and Sandusky is on the SW side of the island. A small-craft basin is on the E side of the broad bight on the S side of the island. Jetties protect the entrance channel to the basin. In May 1980, shoaling to 4 feet was reported to extend 75 feet W from the outer end of the S jetty. The basin has a depth of about 8 feet. Gasoline, water, and ice are available.

(679) W of **Carpenter Point,** the W point of Kelleys Island, several submerged rocks are covered less than 18 feet. A rock, covered 12 feet, is marked on the S side by a lighted buoy 0.6 mile WNW of Carpenter Point. A wreck, covered 17 feet, is 0.6 mile N of the point.

(680) **American Eagle Shoal,** extending W from Carpenter Point, has a least depth of 10 feet about 1.7 miles W of the point. **South Shoal,** with depths of 15 to 18 feet, continues W from American Eagle Shoal. These shoals lie on the NE side of the vessel route through South Passage. Numerous submerged net stakes, covered 13 to 18 feet, are in or near the vessel route SE of South Shoal.

(681) **Scott Point Shoal,** W of South Shoal on the SW side of the vessel route, is rocky and has a least depth of 11 feet at the NE end where it is marked by a lighted buoy. From the buoy, the shoal extends SW to within 0.6 mile of **Mouse Island. Mouse Island Reef,** with a least depth of 9 feet, is on the SW side of the vessel route, 1 mile WNW of Scott Point Shoal. **Starve Island Reef,** with a least depth of 7 feet, is on the NE side of the vessel route and is marked off its W side by a lighted buoy. **Starve Island,** 1 mile N of Starve Island Reef, is on a shoal bank off the SE side of South Bass Island. The shoal bank extends from South Bass Island to an 8-foot spot 0.5 mile SE of Starve Island. A deepwater passage about 0.4 mile wide is between the 8-foot spot and Starve Island Reef.

(682) **South Bass Island,** about 3.5 miles long NE and SW, is 2.5 miles N of Mouse Island and 5 miles NW of Kelleys Island. Shoals extend 0.2 to 0.5 mile off the SE side of the island except at Starve Island, and the W side of the island is deep-to. **South Bass Island Light** (41°37.7′N., 82°50.5′W.), 74 feet above the water, is shown from a white skeleton tower with a red and white diamond-shaped daymark on the SW point of the island.

(683) **Put-In-Bay,** a semicircular inlet on the N side of South Bass Island, is protected on the W side by **Peach Orchard Point.** A shoal with a least depth of 2 feet extends 0.25 mile NE from the point and is marked at the outer end by a lighted buoy. **Gibraltar Island** is a small bold islet in the W part of the bay on the E side of Peach Orchard Point. Shallow water is between the SW side of the island and the shore. A buoy marks a detached shoal with a least depth of 10 feet on the E side of the bay.

(684) **Perrys Victory and International Peace Memorial,** commemorating his victory in the naval battle of 1813, is a conspicuous landmark on the E side of Put-In-Bay on the narrow constriction of South Bass Island. The 335-foot monument is a granite tower marked by a light and surmounted by a glass-covered bronze bowl.

(685) **Put-In-Bay, Ohio,** a harbor on the S side of the bay, is used principally for fruit shipments and excursion business.

(686) **Channels.**–The approach to the harbor is marked by lighted and unlighted buoys. A dredged channel, marked by buoys, leads W along the piers on the S side of the bay. In 1975, the controlling depths were 14 feet in the E part of the channel and 8 feet in the W part.

(687) Small-craft facilities at Put-In-Bay provide gasoline, diesel fuel, water, electricity, sewage pump-out, and a 5-ton hoist.

(688) **Green Island,** rocky and wooded, is 1 mile W of South Bass Island. A light marks the W end of the island. A shoal extends 0.3 mile off the E end.

(689) **Kelleys Island Shoal,** with a least depth of 2 feet, is NE of Kelleys Island. A narrow channel with depths of 18 feet or more is between the NE end of Kelleys Island and the SW end of the shoal. The NE end of the shoal is about 2.5 miles from the island and is marked by a lighted buoy. A buoy marks the NW side of the shoal.

(690) **Gull Island Shoal,** 2.4 miles N of Kelleys Island, is marked on the S side by a lighted buoy. The shoal extends 1.5 miles NE from the buoy. The SW part of the shoal has numerous bare rocks.

(691) **Middle Island** is about 1.6 miles N of Gull Island Shoal. A dangerous sunken wreck is on the SW side of the island. A deep passage about 0.5 mile wide is between the island and Gull Island Shoal.

(692) **Ballast Island** is about 0.8 mile NE of the NE point of South Bass Island with shoal water between. A channel with a depth of about 8 feet and marked by buoys leads across the bank about 0.3 mile S of Ballast Island. The N side of Ballast Island is deep-to and is marked by a light.

(693) **Middle Bass Island** is 0.5 mile N of the NE projection of South Bass Island, and the main body of the island extends N 1.5 miles. From the NE end of the island, a narrow peninsula extends 1.4 miles ENE. A shoal with bare rocks extends 0.75 mile from the end of the peninsula and is marked by a lighted bell buoy. **Sugar Island** is connected to the NW corner of Middle Bass Island by a rocky ledge covered 1 foot. A 10-foot spot is about 0.5 mile NE of Sugar Island. The E, S, and W sides of Middle Bass Island have deep water within 0.3 mile.

(694) **Rattlesnake Island,** 1 mile W of Middle Bass Island, has clean shores except for a shoal extending 0.15 mile from the E end and a shoal and small islet extending 0.3 mile from the W end. A wreck, covered 23 feet, is 1.2 miles WNW of the island.

(695) **North Bass Island** is about 1 mile N of Middle Bass Island. Shoals and rocks extend about 0.4 mile offshore around the island except on the W side where a broad bank with depths of 5 to 12 feet extends 1.2 miles off. A buoy marks the SW extremity of the bank. A lighted buoy marks the extent of shoals off the NE side of the island.

(696) **Charts 14830, 14844.**–An extensive group of shallow rocky spots, covered 10 to 16 feet, is about 1 to 2.5 miles N of North Bass Island. A buoy and a lighted bell buoy mark the S and W extremities of the area, respectively. A dangerous sunken wreck is just SE of the shoals.

(697) A group of small islands and bare rocks is on a shallow bank centered about 4 miles N of North Bass Island. **Hen Island,** 4.5 miles N of North Bass Island, is the largest and northernmost of the group. Shallow water extends about 0.2 mile offshore around the island. About 1 mile S of Hen Island, a very shallow bank extends 2 miles E and W. The other islands of the group are on this bank. **Little Chicken Island** is a small outcropping 1.1 miles S of Hen Island. On the N part of the bank, 0.4 mile NNW of Little Chicken Island, is a 2-foot spot. Between this spot and Hen Island is a deep passage about 0.25 mile wide. **Chick Island,** 4 feet high, is about 1.2 miles SW of Hen Island. Bare rocks are off the NW and SE sides of the island. **Big Chicken Island,** 12 feet high, is about 1.6 miles SW of Hen Island; bare rocks are off the NW side of the island. A depth of 11 feet is available across the center of the bank between Big Chicken Island and Little Chicken Island.

(698) **Hen Island Shoal,** with a least depth of 18 feet, is 1.3 miles N of Hen Island and is unmarked.

(699) **East Sister Island** is 8.5 miles W of Sheridan Point on Pelee Island and 3.2 miles NW of Hen Island. Shoals extend off about 0.25 mile around the island. **East Sister Shoal,** with a least depth of 4 feet, is 0.8 mile NE of the island.

(700) **North Harbour Island,** 0.7 mile N of East Sister Island, is on a shallow bank with depths to 8 feet extending 0.4 mile N and SE from the island.

(701) **Chart 14830.–North Harbour Island Reef,** with a least depth of 2 feet and marked on the N side by a lighted buoy, is 1.6 miles N of North Harbour Island. In rough weather, vessels should not attempt passage between the island and the reef.

(702) **Middle Sister Island,** the northwesternmost of the Lake Erie island group, is 7.6 miles WNW of East Sister Island. The island, about 0.3 mile long, is marked at the NE end by a light. Shoals extend about 0.4 mile off the S shore.

(703) **West Sister Island** (41°44.4′N., 83°06.4′W.), the westernmost of the island group, is about 8.5 miles NNW of Locust Point on the S lakeshore. The shores of the island are deep-to except for **West Sister Reef,** a 1-foot shoal extending 0.4 mile off the SE side. A light marks the SW end of the island.

(704) **Charts 14830, *2123.–Pelee Passage, Ont.** is the main vessel route through the island group in the W end of Lake Erie. The passage is bounded on the SW side by **Pelee Island,Ont.** and its contiguous shoals and on the N side by **Point Pelee, Ont.** and its contiguous shoals. The controlling depth through the passage is about 29 feet. Lighted midchannel buoys mark the turns through the passage, and lights and buoys mark the bordering shoals.

(705) **Canadian Waters.–Bar Point** (42°02.7′N., 83°06.0′W.) is the rounding point of land forming the E side of the mouth of the Detroit River. The **International Boundary** roughly bisects the mouth of the Detroit River and thence proceeds upstream in a N direction, putting Bar Point in Canada. Proceeding easterly from Bar Point along the N shoreline of Lake Erie, to past the Welland Canal, to the headwaters of the Niagara River, the entire shoreline is in Canada. For a description of the Canadian waters/shoreline of Lake Erie see **Canadian Sailing Directions CEN303**; this includes Pelee Island and Pelee Passage.

# 7. DETROIT RIVER

(1) **Chart Datum, Detroit River.**–Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to the sloping surface of the river corresponding to a Lake St. Clair stage of 572.3 feet (174.4 meters) and a Lake Erie stage of 569.2 feet (173.5 meters) above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985), which elevations are the planes of Low Water Datum for the two lakes. (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

(2) **General description.–Detroit River** is about 32 miles long from Detroit River Light at its mouth in Lake Erie to Windmill Point Light at the head of the river at Lake St. Clair.

(3) The lower part of the river is broad and is filled by many islands and shallow expanses. The river banks in this part are more flatly sloping than those in the upper river. The river bottom is generally earth and boulders, except for a section of bedrock and boulders about 6 miles N of the lower end of Bois Blanc Island. Extensive rock excavation and dredging have been necessary to provide channels for deep-draft vessels.

(4) The upper 13 miles of the river is a single deep channel, except at its head where it is divided by Peach Island and Belle Isle. The river banks in this stretch are quite steep, and the bottom is earth.

(5) **Canadian Waters.**–Once upstream of Detroit River Light, the **International Boundary** either parallels the main ships channels of the Detroit River, or lays within the same. For a detailed description of the Canadian shoreline/facilities in the Detroit River consult **Canadian Sailing Directions CEN304, Chapter 1, Detroit River**

(6) **Channels.**–Two dredged channels lead from Lake Erie to the mouth of Detroit River. East Outer Channel, a two-way passage, extends NNW from the lake to Detroit River Light. West Outer Channel passes W of the light and provides a passage for vessels of moderate draft bound for Monroe or Toledo.

(7) Above Detroit River Light, lower Livingstone Channel is a two-way passage to the junction with Amherstburg Channel. From the junction, the two channels extend N to the junction with Ballards Reef Channel, Amherstburg Channel for upbound traffic and Livingstone Channel for downbound traffic. Ballards Reef and Fighting Island Channels lead from the upper junction of Amherstburg and Livingstone Channels to the N end of Fighting Island. From here, natural deep water can be carried to the upper end of Belle Isle, thence a dredged channel leads to Lake St. Clair.

(8) The channels through the river are well marked by lights and buoys.

(9) **Anchorage.**–Numerous submerged pipelines and cables are in Detroit River. Vessel masters are advised to exercise caution when coming to anchor in the river.

(10) **Fluctuations of water level.**–Each year the normal seasonal fluctuations produce a difference of about 2 feet between the highest and lowest monthly mean levels in the river. However, strong E or W winds can raise or lower, respectively, the water levels in the W end of Lake Erie and in the lower Detroit River by as much as 6 feet within 8 hours. Atmospheric pressure changes may cause temporary water level fluctuations of 1 foot or more.

(11) On the 5th and 20th of each month the District Engineer, Corps of Engineers, Detroit, publishes a bulletin of the predicted range of water levels. (See appendix for address.)

(12) Water level information for the Gibralter area may be obtained by contacting Detroit Coast Guard Group on VHF-FM channel 16. The information is given in whole inches above or below chart datum. In addition, Detroit Group at the beginning of the scheduled radio broadcast notice to mariners (see schedule in the appendix) includes this information.

(13) **Currents, Detroit River.**–The following currents are based on the averages of water flow through the entire cross section of the river, that is, from bank to bank and from the surface to the bottom during normal water flow conditions. Normal water flow conditions are encountered when there is no wind, Lake St. Clair is at a stage of 573.9 feet (174.9 meters), and the lower Detroit River (Lake Erie) stage is 571.0 feet (174.0 meters) above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985), that is 1.6 feet (0.5 meter)and 1.8 feet (0.5) meter) above their respective Low Water Datums. The current encountered at midstream is usually about 1.5 times the average velocity. Greater velocities may be expected when the difference between the lake levels is greater, or when lake stages are higher.

(14) Currents for the following locations on the Detroit River are given at high water flow of 210,000 cubic feet per second (cfs), medium water flow of 184,000 cfs, and low water flow of 170,000 cfs, respectively.

(15) Livingstone Channel Upper Entrance Light: 0.8 mph (0.7 knots), 0.7 mph (0.6 knots), and 0.7 mph (0.6 knots)

(16) Fighting Island Channel North Light: 1.5 mph (1.3 knots), 1.5 mph (1.3 knots), and 1.4 mph (1.2 knots)

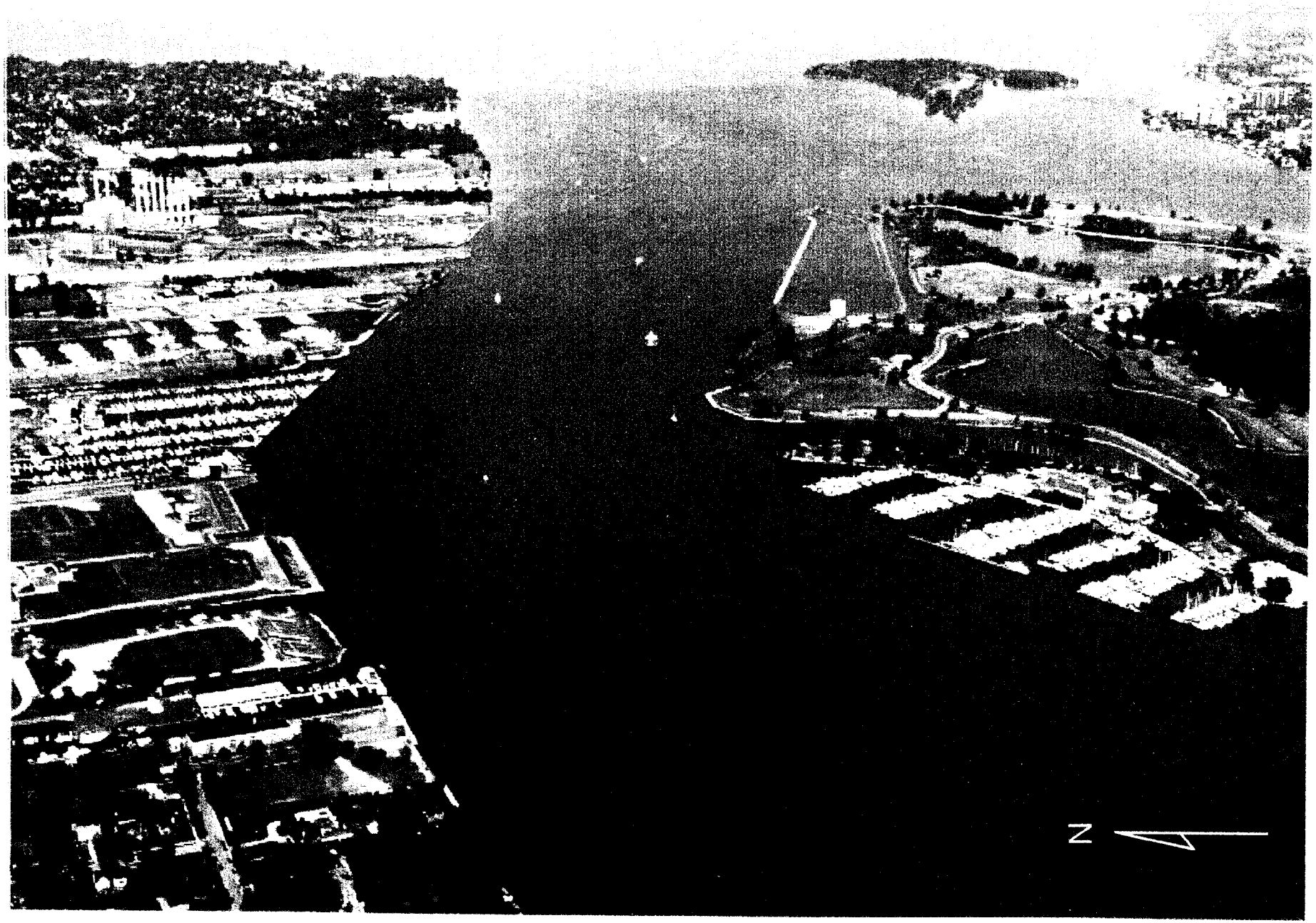
(17) 1.7 miles below the Ambassador Bridge: 1.6 mph (1.4 knots), 1.4 mph (1.3 knots), and 1.3 mph (1.2 knots)

(18) Lower end of Belle Isle: 1.4 mph (1.2 knots), 1.3 mph (1.1 knots), and 1.2 mph (1.0 knot)

(19) Peche Island Light: 1.5 mph (1.3 knots), 1.4 mph (1.2 knots), and 1.2 mph (1.1 knots).

(20) **Weather, Detroit River and vicinity.**–Detroit, MI, is located near the west shore of Lake Erie and in the southwestern part of the state on a rather large isthmus of land that separates Lake Erie from Lake Huron. Within this isthmus lies the Detroit river which not only acts as a natural border between Ontario and Michigan, but also serves to connect Lake Erie with Lake St. Clair. Detroit averages about 12 days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 83°F (28.3°C) and an average minimum of 62°F (16.7°C). January is the coolest month with an average high of 31°F (-0.6°C) and an average minimum of 16°F (-8.9°C). The highest temperature on record for Detroit is 104°F (40°C) recorded in June 1988 and the lowest temperature on record is -21°F (-29°C) recorded in January 1984. About 133 days each year experience temperatures below 32°F (0°C) and an average 14 days each year records temperatures below 5°F (-15°C). Every month has seen temperatures below 40°F (4.4°C) except July (extreme minimum of 41°F (5°C) recorded in July 1965) and every month except June, July, and August has recorded temperatures below freezing (0°C).

**Detroit River, head of**



(21) The average annual precipitation for Detroit is 32.2 inches (818 mm) which is fairly evenly distributed throughout the year. Precipitation falls on about 201 days each year. The wettest month is June with 3.6 inches (91 mm) and the driest is February with only 1.7 inches (43 mm). An average of 32 thunderstorm days occur each year with June and July being the most likely months. Snow falls on about 82 days each year and averages about 41 inches (1041 mm) each year. January is the snowiest month averaging about 11 inches (279 mm). An eighteen inch (457 mm) snowfall in 24-hours occurred in December 1974. About eight days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June through September. Fog is present on average 159 days each year and is evenly distributed throughout the year with a slight maximum in during the Autumn.

(22) The prevailing wind direction in Detroit is the southwest. The winter season and transitional months of January through April are the windiest period averaging around 12 knots. Extremes often occur in squall lines or thunderstorms. A maximum gust of 82 knots occurred in June 1973. Winds along the river blow mainly out of the southwest and west, but others are common. In spring and summer, north through east winds are frequently encountered as are northwesterlies and southerlies in fall and winter.

(23) (See page T-7, for **Detroit Climatologal table**.)

(24) **Ice.**–The lower part of the Detroit River, below Fighting Island, is generally shallow and has the same freezing characteristics as the W end of Lake Erie, forming an average thickness of 7 inches and an average maximum thickness of 11 inches. This ice generally starts to clear by mid-March because of the temperatures and the prevailing W winds. The upper part of the river is generally ice free except for shore ice and occasional drift ice. However, as a track is opened through Lake St. Clair, the broken ice will accumulate in the river above the natural ice cover in the lower part of the river. (See Winter Navigation, chapter 3.)

(25) **Navigation regulations.**–A vessel traffic reporting system and related navigation regulations have been established for the connecting waters from Lake Erie to Lake Huron. (See **33 CFR 162.130 through 162.140**, chapter 2, for regulations.)

(26) **Vessel Traffic Service.**–The Canadian Coast Guard operates a Vessel Traffic Service in Canadian waters from Long Point in Lake Erie through the Detroit and St. Clair Rivers to De Tour Reef Light in Lake Huron. (See chapter 3 and the Annual Edition of Canadian Notices to Mariners for complete information.)

(27) **Pilotage.**–The waters of the Detroit River are Great Lakes designated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for the Detroit River are supplied by Lakes Pilots Association. (See appendix for address.) Pilot exchange points are 1 to 2 miles S of Port Colborne in Lake Erie, just below the Ambassador Bridge in Detroit River, and off Port Huron at the head of St. Clair River in about 43°05′30″N., 82°24′42″W. The pilot boat in the Detroit River, J. W. WESTCOTT II, has a black hull encircled by an orange band and a white cabin with the words "U.S. Mail" in black letters. Three pilot boats are at Port Huron: HURON BELLE has an international orange hull with an aluminum cabin, and HURON MAID and HURON LADY each have an international orange hull with a white cabin. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

(28) **Principal ports.**–The principal ports on the Detroit River are at Trenton, Wyandotte, and Detroit, Mich., and Windsor, Ont. Deep-draft facilities have been developed throughout the length of the river.

(29) **Charts 14830, 14848, 14853, 14854.**– The **Detroit River** flows S from Lake St. Clair and empties into the NW end of Lake Erie.

(30) **Detroit River Light** (42°00.0′N., 83°08.5′W.), 55 feet above the water, is shown from a white conical tower, upper part black, on a hexagonal pier in 20 feet of water at the mouth of the Detroit River at the junction of East and West Outer Channels. A racon, fog signal, and radiobeacon are at the light.

(31) **Channels.–East Outer Channel** and **West Outer Channel**, dredged and well marked, lead northward through the shallows at the upper end of Lake Erie to the mouth of the Detroit River. Immediately N of Detroit River Light, the channels merge to form lower Livingstone Channel. In April-June 1991, East Outer Channel had a controlling depth of 26 feet for a midwidth of 900 feet. In June 1987, West Outer Channel had a controlling depth of 16 feet for a midwidth of 700 feet.

(32) East Outer Channel is a two-way passage. West Outer Channel may be used by downbound vessels whose drafts permit. (See **33 CFR 162.130, through 162.140,** chapter 2, for regulations.) East Outer Channel Light 1 is equipped with a racon and a fog signal.

(33) From Detroit River Light, lower Livingstone Channel provides for two-way traffic to the lower junction of Amherstburg Channel and upper Livingstone Channel, 1.5 miles SW of Bar Point, the E entrance point to the river. In 1996-May 1997, the controlling depth was 28 feet (8.5 m), except for lesser depths along the sides.

(34) An unmarked temporary **dumping ground** is in the approach to the Detroit River between East and West Outer Channels.

(35) **Small-craft facilities.**–Numerous marinas on the Detroit River and adjacent waters provide gasoline, diesel fuel, water, ice, electricity, marine supplies, sewage pump-out, railway and hoists to 250 tons and 150 feet. A launching facility for craft to 34 feet is on the waterway N of Belle Isle.

(36) **Charts 14830, 14848, 14846.–Huron River** empties into the NW end of Lake Erie through the marshes on the W side of the mouth of the Detroit River. Depths are about 2 feet over the bar, thence 5 to 10 feet in the lower part of the river. A fixed highway bridge with a clearance of 11 feet crosses the river about 1.8 miles above the mouth. An overhead power cable on the W side of the bridge has a clearance of 38 feet. A **slow-no wake speed** is enforced on the Huron River. A marina on the S side of the river below the highway bridge provides gasoline, water, electricity, sewage pump-out, a launching ramp, and a 6-ton crane.

(37) **Charts 14848, 14853.**–In the lower part of the Detroit River, from SW of Bar Point N for about 7 miles, the dredged channel divides into upbound and downbound channels. The upbound channel E of Bois Blanc Island comprises Amherstburg Channel and the lower mile of Ballards Reef Channel. The downbound channel is Livingstone Channel, W of Bois Blanc Island.

(38) **Amherstburg Channel** comprises three reaches. **Hackett Reach** extends about 3.7 miles NE from the junction with Livingstone Channel to the lower end of Bois Blanc Island, thence **Amherstburg Reach** extends about 1 mile to the upper end of Bois Blanc Island, and thence **Limekiln Crossing Reach** extends about 1.2 miles to the junction with Ballards Reef Channel.

(39) The channel through each of the reaches is 600 feet wide The W half of the channel is the deep-draft channel and is separated from the E or light-draft channel by lighted buoys. The Federal project depth in the W half of the channel is 28½ feet ir

Hackett Reach and 27½ feet in Amherstburg and Limekiln Crossing Reaches with 21 feet in the E half through the entire channel. In May 1997, the controlling depths were 27 feet (8.2 m) in the W half, except for lesser depths along the W channel edges, and 20 feet (6.1 m) in the E half, except for lesser depths along the E channel edges.

(40) The channels are well marked by lights and lighted and unlighted buoys. The deep-draft channel is marked by a lighted range in each reach.

(41) Because of current effects, mariners are advised to exercise caution when turning from Hackett Reach into Amherstburg Reach.

(42) **Anchorage.**–Care should be exercised when anchoring in Amherstburg Channel between its upper end and the S end of Bois Blanc Island. The current in this area may cause the anchor to drag and overturn rocks, which may then become obstructions. Dragging can probably be lessened or entirely avoided by paying out sufficient length of chain before strain is brought to bear on the anchor.

(43) Canadian regulations specify a **speed limit** of 8 knots for vessels of 15 gross tons and over in Amherstburg Channel.

(44) The upper part of **Livingstone Channel,** passing E of the lower half of Grosse Ile and W of Bois Blanc Island, is about 6.7 miles long from its N entrance at Ballards Reef Channel to its S junction with Amherstburg Channel 1.5 miles SW of Bar Point. This section of Livingstone Channel is for downbound vessels except that traffic becomes two-way under certain winter conditions designated by the Commander, Ninth Coast Guard District. (See **33 CFR 162.130, through 162.140,** chapter 2, for regulations.) Most of the channel is revetted on both sides with rock excavated from the channel. Most of the revetment is low and wooded.

(45) The channel is well marked with lights and buoys. **Ballards Reef Channel Light 77D**(42° 08.5′N., 83° 07.5′W.) marks the W side of the downbound turn into the entrance to Livingstone Channel at its junction with Ballards Reef Channel. Because of the strong E set of the current at the junction of Livingstone and Ballards Reef Channels, mariners are advised to favor the W side, if draft permits.

(46) N from its junction with Amherstburg Channel to the junction with Ballards Reef Channel, Livingstone Channel has a Federal project depth of 29 feet (8.8 m) in the lower part and 27.7 feet (8.4 m) in the upper part. In 1996-May 1997, the controlling depth was 26 feet (7.9 m), except for lesser depths along the sides of the channel.

(47) Canadian regulations specify a **speed limit** of 10 knots in Livingstone Channel for vessels of 500 gross tons and over.

(48) Various forms of submerged and exposed compensating dikes extend to the W from the W channel revetment, connecting with Stony Island in the N part and extending to within about 400 feet of Sugar Island at the midpoint of the channel.

(49) **Bois Blanc Island, Ont.,** popularly known as Bob-Lo Island, is in the lower part of the Detroit River, close to the Canadian mainland and separated from it by Amherstburg Channel. The island is a large amusement park. A marina on the W side of the island has water and electricity. Ferries connect the island with Amherstburg, Ont., and Detroit, Mich.

(50) **Caution.**–Numerous small craft have reported striking two submerged obstructions between the W side of Bois Blanc Island and the Livingstone Channel revetment; caution is advised.

(51) **Amherstburg, Ont.,** is a town on the E side of the Detroit River, opposite Bois Blanc Island.

(52) The following is extracted from **Canadian Sailing Directions CEN304, First Edition**.

(53) *The limits of Amherstburg Harbour are defined as all of the waters of the Detroit River and of Lake Erie on the Canadian side of the International Boundary south of the southerly limit of Windsor Harbour and west of the meridian of longitude 83°05′00″W.* The southerly limit of Windsor Harbour is a straight line drawn from Fighting Island North light at the International Boundary (42°14′N., 83°08′W.) in a ***046.5°*** *direction to the high water mark on the shore.*

(54) *Amherstburg is a Public Harbour administered by Transport Canada. For harbour regulations see Sailing Directions booklet CEN 300, General Information, Great Lakes.*

(55) *The town of Amherstburg, with a population of 8,921 (1991), is a tourist resort with much historic appeal, having been a major battleground in the War of 1812 and also the northern end of the Underground Railroad for escaping slaves. There are also chemical, distillation and manufacturing plants in the area.*

(56) *The Canadian Coast Guard Base lies between the Hackett Reach range lights. The south wharf has a buoy maintenance and storage building; the wharf is 250 feet (76.2 m) long and had a depth of 21 feet (6.4 m) in 1994. A protected basin formed by the northern part of the south wharf had a depth of 3 feet (0.9 m) in 1994. The north wharf, 290 feet (88.4 m) long, has workshops and office buildings. In an emergency, temporary berthing at the Canadian Coast Guard Base may be arranged with the Sub-District Manager.*

(57) *Amherstburg is a* ***Customs vessel reporting station*** *for pleasure craft.*

(58) *The Allied Chemical wharf, at the upper end of Amherstburg, is a series of dolphins connected by catwalks. The wharf is 300 feet (91.4 m) long with a depth of 21 feet (6.4 m) in 1994.*

(59) *A Canadian Coast Guard Rescue Cutter is based at Amherstburg from the beginning of April to mid-December each year, though these dates are subject to change (see information on Search and Rescue in Sailing Directions booklet CEN 300, General Information, Great Lakes).*

(60) ***Caution.****–Extra care is necessary when anchoring in Amherstburg Channel between its upper end and the south end of Bois Blanc Island; the current may cause an anchor to drag and overturn rocks which then become obstructions.*

(61) *A submerged water intake north of the front structure of the Fort Malden range extends 300 feet (91.4 m) into the river.*

(62) ***Caution.****–Small craft operators have reported striking two submerged obstructions between the west side of Bois Blanc Island and the Livingstone Channel dyke.*

(63) There are several small wharves and marinas in the area of Amherstburg Channel.

(64) *Riverside Marina, 1 mile north of Bar Point, had depths of 2 feet (0.6 m) in 1994 and offered dockage with power outlets, picnic area, pay phone, groceries, bait, tackle, ice, gasoline and diesel fuel.*

(65) *Duffys Motor Inn & Marina, 0.2 mile north of the Coast Guard base, had depths of 1 to 10 feet (0.3 to 3 m) in 1994 and offered dockage with power and water, municipal ramp, motel accommodation (with pool), pay phone, snack bar, restaurant and licensed dining room, ice and gasoline. The facilities and attractions of Amherstburg are all near by.*

(66) *Duffs Marina, 1 mile farther north, had depths of 1 to 2 feet (0.3 to 0.6 m) in 1994 and offered dockage, fishing boat rentals, pay phone, drinking water, some groceries, bait, tackle, snack bar, restaurant, ice and gasoline.*

(67) Four radio masts N of Amherstburg in about 42°08.8′N., 83°05.5′W. are prominent. They are reported to be visible from Point Pelee in Lake Erie to Lake St. Clair.

(68) The lower part of the Detroit River W of Livingstone Channel is open and generally shallow with several small islands. Natural channels with depths of about 13 feet and less, marked by buoys, provide access for small craft.

(69) W of the lower end of the revetments in Livingstone Channel, a small-craft channel marked by buoys leads from the open part of the lower Detroit River between **Sugar Island** and **Meso Island,** along the Grosse Ile shore, and thence W of **Stony Island.** In the narrow part of this channel between Stony Island and Grosse Ile, a line of submerged bridge abutments, with least depths of ½ foot, crosses the channel, and submerged cables follow the same path just to the S and N of the abutments. A buoy marks the W side of the westernmost abutment, and in 1977, the best water was inside the buoy within 150 to 200 feet of the Grosse Ile shore. The W abutment is about 280 feet from shore.

(70) A natural channel marked by buoys leads from open water in the lower part of the Detroit River along the E side of **Celeron Island** and connects with Trenton Channel at Gibraltar. The least depth in this channel is about 8 feet.

(71) **Sugar Island Cut,** about 400 feet wide, is an opening between the E side of Sugar Island and a compensating revetment that extends W from the W revetted wall of Livingstone Channel.

(72) **Hole-in-the-Wall,** W of the N end of Bois Blanc Island, is a 0.2-mile-wide gap in the revetted walls of Livingstone Channel that allows small craft to cross the main channel to the Canadian side of the Detroit River. A strong SW current flows through Hole-in-the-Wall; caution is advised.

(73) Protective riprap extends out 30 feet from the base of the light marking the N end of the W revetment on the S side of Hole-in-the-Wall. The structure should not be passed close aboard, even by vessels of shallow draft.

(74) **Ballards Reef Channel** is about 3.5 miles long from its lower end junction with Amherstburg Channel to its upper end junction with Fighting Island Channel. Upper Livingstone Channel joins Ballards Reef Channel about 1 mile above the latter's lower end. Below its junction with Livingstone Channel, Ballards Reef Channel is normally used for upbound traffic, and above the junction it is used for upbound and downbound traffic.

(75) Ballards Reef Channel is well marked by lights, lighted and unlighted buoys, and by a lighted range at each end. The channel has a Federal project depth of 28½ feet (8.7 m) above the junction with Livingstone Chanel. In 1996-May 1997, the controlling depth was 28 feet (8.5 m), except for lesser depths along the sides. The Federal project depth in Ballards Reef Channel below the junction with Livingstone Channel is 27½ feet (8.4 m); controlling depth for this short section is the same.

(76) An auxilliary channel for light-draft vessels adjoins the E side of Ballards Reef Channel. It is marked by buoys and has depths of about 14 feet.

(77) **Fighting Island Channel** extends from the upper end of Ballards Reef Channel, about 2 miles below the head of Grosse Ile, along the W side of Fighting Island to the natural deep water N of Fighting Island. The channel has a Federal project depth of 28 feet and is well marked by lights and buoys. In November 1993, the controlling depth was 27 feet except for lesser depths along the edges. **Mamajuda Island** and **Grassy Island,** each marked by a light, are close to the W side of the channel.

(78) **Anchorage.**–A deep-draft anchorage, marked on the W side by buoys, is on the W side of the S end of Fighting Island Channel. The anchorage is used when conditions are unfavorable for proceeding through the confined deep channels leading S into Lake Erie. Vessels using this anchorage should be careful to avoid the long shoal extending 0.6 mile S from Mamajuda Island. A buoy marks the S end of the shoal.

(79) A buoyed natural channel leads N from the NW part of the anchorage between the upper end of Grosse Ile and **Mamajuda Island Shoal** and joins with Trenton Channel at Wyandotte, Mich. The controlling depth in the channel is about 21 feet.

(80) **Fighting Island, Ont.,** on the E side of Fighting Island Channel off the Ontario mainland, is about 4 miles long and about 0.5 mile wide. The entire island is either marsh or waste bed fill from various concerns that pump manufacturing residue to the island as waste. Low bluffs are on the W side of the island. A shoal, with a depth of 18 feet at its outer end marked by a lighted buoy, extends 0.5 mile N from the upper end of the island.

(81) From about the midpoint of Ballards Reef Channel, a natural deep channel leads N between Fighting Island and the Canadian mainland. The channel is divided by **Turkey Island, Grassy Island,** and several shoals, but near the upper end, the channels rejoin before merging with the main channel of the Detroit River at the N end of Fighting Island. The channel is marked by buoys; see the latest edition of the chart for general depths. **La Salle, Ont.,** on the E side of the channel at the N end, has several small-craft facilities.

(82) **Grosse Ile, MI,** about 8 statute miles (7 nm) long and 1.5 statute miles (1.3 nm) wide, is the largest island in the Detroit River. It extends along the W side of the dredged river channels from about the midpoint of upper Livingstone Channel N to about the midpoint of Fighting Island Channel opposite the city of Wyandotte, Mich. Trenton Channel separates the W side of the island from the mainland. The N end of the island, **Point Hennepin,** is a waste disposal site; the rest of the island consists mostly of residential communities and private facilities.

(83) **Thorofare Canal,** a large shallow drainage ditch about 3.5 miles long, crosses the body of Grosse Ile in a NE-SW direction. Several highway bridges and overhead cables cross this ditch. Passage should not be attempted without local knowledge.

(84) A **slow-no wake speed** is enforced within 1,000 feet of shore of Grosse Ile, except in Trenton Channel and in the channel between the NE side of the island and Mamajuda Island Shoal. A **slow-no wake speed** is enforced in Thorofare Canal and in the canals between Grosse Ile and the small islands off its S end.

(85) **Charts 14848, 14854, 14853.–Ecorse Channel,** is a buoyed, natural deepwater channel that follows the curve of the Michigan shoreline from the junction of Fighting Island Channel and Trenton Channel SW for about 1.2 miles to its lower junction with Trenton Channel. Between the upper and lower junctions, Ecorse Channel is separated from Trenton Channel by **Mud Island, MI** and the shoals that extend NE and SW from it. Ecorse Channel has a controlling depth of about 13 feet at its NE end, with deeper water in the lower part. **Ecorse, Mich.,** is on the W side of the channel at the mouth of the **Ecorse River.**

(86) A **slow-no wake speed** is enforced within 1,000 feet of shore in the waters of the Detroit River adjacent to the city of Ecorse.

(87) **Trenton Channel** extends from the N end of Fighting Island Channel SW to the Michigan shore, thence S along the shore for about 6 miles to a turning basin at the upper end of the city of Trenton, thence 3 miles to another turning basin at the lower end of the city. The dredged channel, marked by buoys, is separated from the main part of the Detroit River by Grassy Island and Grosse Ile.

(88) In November 1994, the controlling depths were 26 feet (7.9 m) at midchannel from the junction with Fighting Island Channel to and in the turning basin N of Trenton, thence 20 feet (6.1 m) at midchannel to the turning basin S of Trenton with 19 feet (5.8 m) in the basin.

(89) From the lower end of the Trenton Channel lower turning basin, a depth of about 6 feet can be carried through the narrow, crooked natural channels between Grosse Ile and the mainland to the town of Gibraltar and the open river below Grosse Ile.

(90) The Grosse Ile Toll highway bridge, a swing span with a clearance of 10 feet, crosses Trenton Channel 2.2 miles below Point Hennepin. The Grosse Ile Parkway bridge, crossing Trenton Channel just above the lower turning basin, has a swing span with a clearance of 18 feet. (See **33 CFR 117.1 through 117.59 and 117.631,** chapter 2, for drawbridge regulations.)

(91) **Wyandotte, Mich.,** fronts Trenton Channel for about 3 miles opposite Point Hennepin. The city is an important industrial center, and numerous stacks in the city are prominent from the river.

(92) A **slow-no wake speed** is enforced within 1,000 feet of shore in the waters of the Detroit River adjacent to the city of Wyandotte.

(93) **Towage.**–Tugs for Wyandotte are available from Detroit. (See Towage under Detroit.)

(94) **Wharves.**–Wyandotte has several facilities fronting on Trenton Channel. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For information on the latest depths, contact the operators.)

(95) **City of Wyandotte, Power Plant Wharf:** 0.5 mile N of Point Hennepin; 630 feet of berthing space; 23 feet alongside; deck height, 8 feet; open storage for 60,000 tons of coal; occasional receipt of coal; owned and operated by City of Wyandotte.

(96) **St. Mary's (BSF) Wyandotte Cement Wharf:** (42°11′16″N., 83°09′10″W.); 450-foot face, 1,190 feet of berthing space; no longer used or maintained.

(97) **Small-craft facilities.**–Several marinas in the N part of the city provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, launching ramps, and marine supplies. Lifts to 45 tons are available for hull, engine, and radio equipment repairs.

(98) **Trenton, Mich.,** just S of Wyandotte, fronts Trenton Channel opposite Grosse Ile for about 4 miles. The stacks of the Detroit Edison Co., 0.5 mile SW of the Grosse Ile Parkway bridge, are prominent from the river, especially from the S.

(99) **Towage.**–Tugs for Trenton are available from Detroit. (See Towage under Detroit.)

(100) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(101) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(102) A **slow-no wake speed** is enforced within 1,000 feet of shore within the limits of Trenton.

(103) **Wharves.**–Trenton has three deep-draft facilities. (For a complete description of the port facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For information on the latest depths, contact the operators.)

(104) **McLouth Steel Products Corp., Ore Dock:** (43°09.6′N., 83°10.′W.); 1,600-foot face; 28 feet alongside; deck height, 7 feet; open storage for over 2 million tons of iron ore, iron ore pellets, and limestone; receipt of iron ore, iron ore pellets, and limestone; owned and operated by McLouth Steel Products Corp.

(105) **Mobil Oil Corp. Wharf:** (43°08.2′N., 83°10.5′W.); 200 feet of berthing space with dolphins; 21 feet alongside; deck height, 5 feet; loading platform, 9 feet; pipelines extend to storage tanks, capacity over 1¼ million barrels; occasional receipt and shipment of petroleum products; owned and operated by Mobil Oil Corp.

(106) **Detroit Edison Trenton Channel Plant Wharf:** W side of Trenton Channel lower turning basin; 960-foot face; 19 to 23 feet alongside; deck height, 9 feet; open storage for 732,000 tons of coal; receipt of coal; owned and operated by Detroit Edison Co.

(107) **Small-craft facilities.**–Two marinas at Trenton provide gasoline, diesel fuel, water, ice, electricity, marine supplies, a 10-ton hoist, and launching ramps.

(108) **Charts 14848, 14853.–Gibraltar, Mich.** is a town on the Michigan mainland opposite the S end of Grosse Ile, about 2 miles below the Trenton Channel lower turning basin. Private lights and a private **239°** lighted range mark the entrance channel to Gibraltar from the Detroit River. The range should be followed closely because of rocks along the S side of the channel. A **slow-no wake speed** is enforced within 500 feet of shore within the limits of Gibraltar. Marinas inside the entrance channel provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Hoists to 30 tons are available for hull and engine repairs.

(109) **Lake Erie Metropark Marina,** developed by the Michigan State Waterways Commission, about 3 miles S of Gibraltar, provides transient berths with electricity, water, and sewage pump-out for boats no greater than 30 feet. The entrance is marked by private lighted and unlighted buoys and a **270°** lighted range.

(110) Above Fighting Island, for about 9 miles to Belle Isle, the Detroit River narrows into a single channel from 0.35 to 0.5 mile wide. In this stretch the river is generally clear, with depths of 29 to 43 feet at midriver. Buoys mark the principal shoals that extend off the banks of the river.

(111) The most prominent feature on the Detroit River is the Renaissance Center (42°19′44″N., 83°02′24″W.). The flashing light atop the building is reported to be visible for more than 20 miles.

(112) **Anchorage.**–An anchorage designated by the Canadian Government is 1 mile above the N end of Fighting Island. The anchorage, 800 feet by 4,000 feet with depths of 31 to 36 feet, is marked by a lighted buoy at the SE corner and a light at the NE corner.

(113) A shoal, with rocks that bare, extends 400 feet off the W side of the river about 1.3 miles N of Fighting Island. Lighted buoys mark the outer edge of the shoal.

(114) **Wharves.**–There are several deep-draft facilities along the W side of the river between the N end of Fighting Island and the mouth of the River Rouge, 2 miles upstream. (For a complete description of the facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For information on the latest depths, contact the operators.)

(115) **Nicholson Terminal and Dock Co., Ecorse Pier:** (42°15.6′N., 83°07.3′W.); 1,820 feet of berthing space N side, 25 to 28 feet alongside; 486-foot face, 36 feet alongside; 1,230 feet of berthing space S side, 8 to 16 feet alongside; deck height, 9 feet;

24,000 square feet covered storage; 9 acres open storage; cranes to 200 tons; receipt and shipment of general and containerized cargo, steel, coal, scrap metal, and tallow; owned and operated by Nicholson Terminal and Dock Co.

(116) **Allied Oil Co., Ecorse Terminal Dock:** inner end of wharf across slip N of Nicholson Terminal and Dock Co., Ecorse Pier; 500 feet of berthing space; 24 feet alongside; deck height, 8 feet; storage tanks, capacity 835,000 barrels; receipt and shipment of petroleum products; owned by Great Lakes Steel, Division of National Intergroup Corp. and operated by Allied Oil Co.

(117) **Repairs.**–Nicholson Terminal and Dock Co. operates a floating drydock at the inner end of their pier. The 2,500-ton drydock is 170 feet long with a width of 50 to 55 feet and a depth of 13 feet over the keel blocks. Portable equipment is available for making general repairs to vessels at berth anywhere in the harbor.

(118) **Charts 14848, 14853, 14854.–River Rouge** discharges into the Detroit River at the S end of the city of Detroit, about 2 miles above Fighting Island. A Federal project has improved River Rouge as far as a turning basin about 2.5 miles above the entrance.

(119) **Short Cut Canal** is the section at the entrance to River Rouge from Detroit River to the junction with **Old Channel**. The canal avoids the large bend in the old river channel (Old Channel) at the lower part of River Rouge, and shortens the distance to facilities upstream by more than 1 mile. The connection between Short Cut Canal and Old Channel has created **Zug Island,** which is occupied by large industrial corporations.

(120) In July 1996, the controlling depths were 16 feet (21 feet at midchannel) in Short Cut Canal, thence 15 feet (21 feet at midchannel) to the Conrail railroad bridge about 1.48 miles above the mouth, thence 15 feet (18 feet at midchannel) to the Fort Street bridge, thence 13 feet (19 feet at midchannel) to the turning basin at the head of the project. Depths of 17 to 21 feet were available in the middle of the basin with slightly lesser depths along the W edge.

(121) In July 1996, Old Channel from the entrance at Detroit River to the railroad swing bridge 0.8 mile above the entrance has a controlling depth of 12 feet (16 feet at midchannel), thence 14 feet to the junction with Short Cut Canal. The N side of the entrance to Short Cut Canal is marked by a lighted buoy. Rapid shoaling occurs in the canal and river because of the soft bottom. A number of cables, water mains, and tunnels cross under the canal and river; masters should exercise caution when dropping anchors.

(122) **Regulations.**–A **speed limit** of 4 mph is enforced in River Rouge and Short Cut Canal. (See **33 CFR 162.130 through 162.140,** chapter 2, for navigation regulations.)

(123) **Wharves.**–Both sides of River Rouge and Short Cut Canal are lined by industrial corporations and their deep-draft facilities. (For a complete description of facilities in the River Rouge, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For information on the latest depths, contact the operator.) Many of the facilities have railway, water, and electrical shore-power connections.

(124) **Facilities along the S side of Short Cut Canal and River Rouge:**

(125) **Detroit Edison, River Rouge Plant Wharf:** S side of Short Cut Canal entrance; 1,080 feet of berthing space with dolphins; 23 feet alongside; deck height, 9 feet; open storage for over 1 million tons of coal; pipeline to storage tanks, capacity 238,000 barrels; receipt of coal and fuel oil; owned and operated by Detroit Edison Co.

(126) **Midwest Energy Corp., River Rouge Terminal Dock:** at the junction of Short Cut Canal and Old Channel; 460-foot face; 22 feet alongside; deck height, 7 feet; pipelines extend to tank storage, capacity 404,000 barrels; receipt and shipment of petroleum products; owned by Texaco, Inc. and operated by Midwest Energy Corp.,

(127) **Standard Oil, River Rouge Dock:** about 0.2 mile above Midwest Energy Corp., River Rouge Terminal Dock; 1,000-foot face; 16 feet alongside; deck height, 7½ feet; pipelines extend to tank storage, capacity over 1½ million barrels; receipt and shipment of petroleum products; owned and operated by Standard Oil, Division of Amoco Oil Co.

(128) **Marblehead Lime Co., River Rouge Wharf:** 800 feet below West Jefferson Avenue bridge; 1,280 feet of berthing space; 25 feet alongside; deck height, 4 feet; open storage for 350,000 tons of limestone; storage silos for 2,200 tons of lime; owned and operated by Marblehead Lime Co., Division of General Dynamics Corp.

(129) **United States Gypsum Co. Dock:** 800 feet above West Jefferson Avenue bridge; 405-foot face plus 500 feet along natural bank; 21 feet alongside dock; deck height, 6 feet; open storage for 85,000 tons of gypsum; storage silos, capacity 90,000 tons; receipt of gypsum; owned and operated by United States Gypsum Co.

(130) **Detroit Bulk Dock:** 400 feet below ConRail bridge; 509-foot face; 20 feet alongside; deck height, 4 feet; 11 acres of open storage; loading tower, rate 750 tons per hour; receipt of limestone, salt, coal, fluorspar, and coke, shipment of coke, concrete, sand, and limestone; owned by Dale Osborne and operated by Detroit Bulk Dock, Inc.

(131) **Inland Lime and Stone Co., Rouge River Dock:** 700 feet above ConRail bridge; 654 feet of berthing space along natural bank; 18 to 20 feet alongside; bank height, 2 to 6 feet; open storage for 50,000 tons of limestone and 52,000 tons of salt; receipt of limestone and bulk salt; owned and operated by Inland Lime and Stone Co., Division of Inland Steel Co.

(132) **Trumbull Asphalt Co., Detroit Plant Wharf:** 700 feet above Fisher Freeway bridge; 285 feet of berthing space with dolphins; 20 feet alongside; deck height, 6 feet; tank storage with capacity of 131,000 barrels; receipt of asphalt; owned and opperated by Trumbull Asphalt Co.

(133) **Marathon Petroleum Co., River Rouge Terminal Pier:** 500 feet below Fort Street bridge; offshore wharf, 415-foot face; 26 feet alongside; deck height, 5 feet; pipelines extend to storage tanks, capacity 900,000 barrels; shipment of asphalt; owned and operated by Marathon Petroleum Co.

(134) **Marathon Petroleum Co., Fordson Island Terminal Wharf:** NE side of Fordson Island 1,200 feet below Dix Avenue bridge; offshore wharf, 350-foot face; 27 feet alongside; deck height, 5 feet; pipelines extend to storage tanks, capacity over 1¾ million barrels; shipment of petroleum products; owned and operated by Marathon Petroleum Co.

(135) **Detroit Lime Co. Wharf:** 200 feet below Dix Avenue bridge; 300-foot face; 21 feet alongside; deck height, 9 feet; open storage for 350,000 tons of limestone; storage silos for 8,400 tons of lime; receipt of limestone and coal; owned and operated by Detroit Lime Co., subsidiary of Edward Levy Co.

(136) **Facilities on the N side of River Rouge above Short Cut Canal:**

(137) **Detroit Marine Terminals, River Rouge Dock:** 500 feet below West Jefferson Avenue bridge; 1,300-foot wharf, 27 feet alongside; 1,000 feet of natural bank, 21 feet alongside; deck

## Structures across River Rouge
### *Miles above the mouth of the river
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Short Cut Canal and River** | | | | | | | |
| 1 | Overhead cable | Power | 0.32 | | | | 191 | |
| 2 | Overhead cable | Power | 0.37 | | | | 191 | |
| 3 | Overhead pipeline | Gas | 0.39 | | | | 153 | |
| 4 | National Steel Corp. bridge | Railroad | 0.40 | | | 125 | 6 | Bascule. KUZ-371. Notes 1 and 2. |
| 5 | Overhead pipeline | Gas | 0.41 | | | 240 | 123 | |
| 6 | Overhead cable | | 0.45 | | | | 174 | |
| | Junction of Short Cut Canal and Old Channel | | 0.53 | | | | | |
| 7 | West Jefferson Ave. bridge | Highway | 1.10 | | | 125 | 9 | Bascule. Note 1. |
| 8 | ConRail bridge | Railroad | 1.48 | | | 123 | 8 | Bascule. Notes 1 and 2. |
| 9 | Fisher Freeway I—75 bridge | Highway | 1.85 | | | 230 | 100 | Fixed. |
| 10 | Norfolk Southern RR bridge | Railroad | 1.87 | | | 125 | 8 | Bascule. Note 1. |
| 11 | Overhead pipeline | | 1.90 | | | 300 | 103 | |
| 12 | Fort St. bridge | Highway | 2.20 | | | 118 | 9 | Bascule. Note 1. |
| 13 | Dix Ave. bridge | Highway | 2.73 | | | 125 | 8 | Bascule. Note 1. |
| 14 | Overhead cables | Power | 2.75 | | | | 130 | |
| | **Old Channel via the mouth** | | | | | | | |
| 15 | Overhead pipeline | Gas | 0.26 | | | | 153 | |
| 16 | Delray Connecting RR bridge | Railroad | 0.30 | | | 120 | 7 | Bascule. Note 1. |
| 17 | Delray Connecting RR bridge | Railroad | 0.34 | | | 120 | 7 | Bascule. Note 1. |
| 18 | Overhead cable | | 0.77 | | | | 188 | |
| 19 | Delray Connecting RR bridge | Railroad | 0.80 | 102 | | | 7 | Swing. Turntable on right side. Note 1. |
| 20 | Overhead cable | | 0.82 | | | | 188 | |
| | Junction of Old Channel and Short Cut Canal | | 1.55 | | | | | |

Note 1.—See **33 CFR 117.1 through 33 CFR 117.59,** chapter 2, for drawbridge regulations.)
Note 2.—The bridgetender monitors VHF-FM channel 16 (156.80 MHz) and works on channel 12 (156.60 MHz).

height, 5 feet; 23,000 square feet covered storage; 45 acres open storage; cranes to 250 tons; receipt and shipment of general and containerized cargo, receipt of fluorspar and ferro-manganese, shipment of scrap metal and coke; owned and operated by Detroit Marine Terminals Inc.

(138) **Concrete Mix Supply Co. Wharf:** immediately above West Jefferson Avenue bridge; 735-foot face along natural bank; 15 feet alongside; deck height, 6 feet; open storage for 90,000 tons of limestone; receipt of limestone; owned by P. A. Wolfe and operated by Concrete Mix Supply Co.

(139) **Marblehead Lime Co. Wharf:** 1,400 feet above West Jefferson Avenue bridge; 900 feet of berthing space; 21 feet alongside; deck height, 8 feet; open storage for 110,000 tons of material; receipt of limestone and coal; owned and operated by Marblehead Lime Co.

(140) **Peerless Cement Co., Detroit Plant Wharf:** 900 feet below Fisher Freeway bridge; 600-foot face and 250 feet along natural bank; 21 feet alongside; deck height, 13 feet; 154,000 square feet covered storage for clinker; open storage for 69,000 tons of coal; storage silos for 69,000 tons of cement; receipt of limestone, gypsum, and coal; owned and operated by Peerless Cement Co.

(141) Harridon Terminal Inc.: 600 feet above Fisher Freeway bridge; 792-foot face; 26 feet reported alongside; deck height, 8 feet; receipt and shipment of bulk products, scrap iron, and steel; operated by Harridon Terminal, Inc.

(142) **Morton Salt CO., Detroit Wharf:** 1,100 feet above Fisher Freeway bridge; 500 feet of berthing space along natural bank; 15 feet alongside; deck height, 7 feet; silo storage for 8,000 tons of salt; open storage for 38,000 tons of salt; receipt of bulk salt; owned and operated by Morton Salt Co.

(143) **Rouge Steel Co., Coal Tar Dock:** N side of the turning basin; 1,300-foot face; 27 feet alongside; deck height, 6 feet; pipeline extends to tank storage, capacity over 2½ million gallons; shipment of coal tar; owned and operated by Rouge Steel Co.

(144) **Rouge Steel Co., East Dock:** E side of the slip on the NW side of the turning basin; 2,614-foot face; 25 feet alongside; deck height, 6 feet; storage trough for 152,000 tons of material; open storage for 437,000 tons of coal, 308,000 tons of limestone, and 800,000 tons of iron ore and pellets; three bucket unloaders, combined unloading rate 3,500 tons per hour; receipt of iron ore, iron ore pellets, coal, and limestone; shipment of mill scale; owned and operated by Rouge Steel Co.

(145) **Rouge Steel Co., West Dock:** W side of the slip on the NW side of the turning basin; 2,915-foot face; 25 feet alongside; deck height, 6 feet; open storage for 11,000 tons of limestone; receipt of limestone; owned and operated by Rouge Steel Co.

(146) **Facilities on the mainland side of Old Channel:**

(147) **Allied Chemical Co. Tar Plant, Coal Tar Dock:** 1,800 feet above mouth of river; 275 feet of berthing space with shore moorings; 22 feet alongside; deck height, 5 feet; pipeline to storage tanks, capacity over 3¼ million gallons; receipt and shipment of coal tar, shipment of creosote; owned and operated by Allied Chemical Co.

(148) **Allied Chemical Co. Tar Plant, Pitch Dock:** 2,400 feet above mouth of river; 250 feet of berthing space with dolphins; 22 feet alongside; deck height, 8 feet; open storage for 18,000 tons of bulk pitch; shipment of bulk pitch; owned and operated by Allied Chemical Co.

(149) **Facilities on Zug Island:**

(150) All the facilities on Zug Island are owned and operated by Great Lakes Steel, Division of National Intergroup, Inc.

(151) **Great Lakes Steel, Ore Dock No. 1:** N side of the island at the mouth of Old Channel; 1,287-foot face; 21 feet alongside; deck height, 8 feet; open storage for 860,000 tons of iron ore and pellets; receipt of iron ore, iron ore pellets, and limestone.

(152) **Great Lakes Steel, Dock A:** N side of the island 0.6 mile above the mouth of Old Channel; 1,000 feet of berthing space along natural bank; 17 feet alongside; bank height, 8 feet; open storage for 160,000 tons of coal; receipt of coal.

(153) **Great Lakes Steel, Dock B:** NW side of the island 0.6 mile below junction with Short Cut Canal; 1,000 feet of berthing space along natural bank; 17 feet alongside; bank height, 8 feet; open storage for 260,000 tons of coal; receipt of coal.

(154) **Great Lakes Steel, Short Cut Canal Dock:** S side of the island at the mouth of Short Cut Canal; 1,300 feet of berthing space along natural bank; 21 feet alongside; bank height, 8 feet; open storage for 90,000 tons of coal; receipt of coal.

(155) **Great Lakes Steel, Stone Dock:** E side of the island on the Detroit River 1,000 feet N of the mouth of Short Cut Canal; 510-foot face; 27 feet alongside; deck height, 8 feet; open storage for 220,000 tons of limestone; receipt of limestone and iron ore pellets.

(156) **Great Lakes Steel, Ore Dock No. 3:** E side of the island immediately N of the Stone Dock; 1,349-foot face; 27 feet alongside; deck height, 10 feet; open storage for 898,000 tons of iron ore and over 1 million tons of iron ore pellets; receipt of iron ore, iron ore pellets, and coal.

(157) **Great Lakes Steel, Coal Wharf No. 1:** E side of the island immediately N of Ore Dock No. 3; 2,100-foot face; 25 to 27 feet alongside; deck height, 10 feet; open storage for 450,000 tons of coal; receipt of coal.

(158) **Supplies.**–Bunker fuel is available at several facilities in the river, or by barge or truck. A supply company on the W side of Old Channel has supplies and provisions.

(159) **Charts 14848, 14853.**–About 0.5 mile above the mouth of Old Channel, overhead power cables with a minimum clearance of 165 feet across the Detroit River between Detroit and Windsor, Ont.

(160) The **Ambassador Bridge** crosses the Detroit River 2.2 miles above the mouth of Old Channel. The suspension span has a clearance of 156 feet for 100 feet at the center, decreasing to 133 feet at each side of the river.

(161) A shoal, marked at its outer edge by a lighted buoy, extends off the Canadian side of the river for about 0.5 mile above the Ambassador Bridge.

(162) Two tunnels cross under the Detroit River above the Ambassador Bridge. The ConRail Tunnel, 0.9 mile above the bridge, was covered by a depth of 31 feet at midchannel in 1959, with depths of 24 and 34 feet, 300 feet from the United States shoreline and 350 feet from the Canadian shoreline, respectively. The Detroit-Windsor Tunnel, a highway tunnel 2 miles above the bridge, was covered by a depth of 40 feet at midchannel in 1959, with depths of 24 and 36 feet, 500 feet from the United States shoreline and 350 feet from the Canadian shoreline, respectively. Vessels are cautioned not to anchor over or near these tunnels.

(163) A shoal with a least depth of 15 feet extends off the U.S. shoreline between the two tunnels. Buoys mark the upper and lower ends of the shoal.

(164) **Anchorage.**–A designated deep-draft anchorage is in U.S. waters between the upper tunnel and Belle Isle. (See **33 CFR 110.1 and 110.206**, chapter 2, for limits and regulations.)

(165) **Small-craft facility.**–A public docking facility constructed by the city and the Michigan State Waterways Commission is on the N side of the river about 2.8 miles above the Ambassador Bridge. Water, electricity, and sewage pump-out station are available.

(166) The **harbormaster** assigns berths.

(167) **Belle Isle, MI**, about 3 statute miles (2.6 nm) long and 1 statute mile (0.9 nm) wide, is in midriver near the upper end of the Detroit River. **Fleming Channel**, the main river channel, follows between the S side of the island and the Canadian shore to the head of the river at Lake St. Clair. The lower part of the channel is through natural deep water, thence from about midlength of Belle Isle to Lake St. Clair the channel is dredged. The limits of the dredged channel are marked by lighted buoys. **Belle Isle Light** (42°20.4′N., 82°57.6′W.), 30 feet above the water, is shown from a pile on the SE point of the island and marks the N side of Fleming Channel. In June 1998, the controlling depth was 28 feet, except for lesser depths along the edges and shoaling to 20 feet that extends about 100 feet into the channel on the E edge in the vicinity of Peche Island Light.

(168) A 074°–254° measured mile is reported on the S side of Belle Isle.

(169) **William Livingstone Memorial Light** (42°20.8′N., 82°57.3′W.), 58 feet above the water, shown from a white pyramidal monument on the E end of Belle Isle, is a **247°** leading light marking the entrance to the Detroit River from Lake St. Clair.

(170) Generally, only local and pleasure craft use the channel on the N side of Belle Isle. The lower entrance is marked by a lighted buoy which marks a 6-foot shoal that extends 0.5 mile from the W end of Belle Isle. **Scott Middle Ground** is an extensive shoal area, with depths to 1 foot, between Belle Isle and the U.S. shore. Natural channels marked by buoys lead N and S of the shoal. The N channel has a controlling depth of about 18 feet. Above Scott Middle Ground, a 12-foot spot is marked on its N side by a buoy in midchannel N of Belle Isle. The upper entrance to the channel N of Belle Isle is through a dredged channel marked by buoys. In 1996, the controlling depth was 20 feet (6.1 m). A fixed highway

bridge (Douglas McArthur Bridge) with a clearance of 32 feet crosses from Detroit to the lower end of Belle Isle.

(171) **Erma Henderson Park**, developed by the Michigan State Waterways Commission, is on the mainland side of the channel N of Belle Isle. The park provides transient berths, electricity, water, and sewage pump-out. The entrance is marked by private lights.

(172) **Peche (Peach) Island, Ont.**, is off the Canadian shore on the S side of the head of the Detroit River. Extensive shoals are off the W, N, and E sides of the island. **Peche Island Light** (42°20.9′N., 82°56.5′W.), 44 feet above the water, is shown from a cylindrical tower with a triangular red daymark on the NW side of the shoal off the W end of the island. The light marks the SE side of Fleming Channel, but should not be passed close aboard because of protective riprap. A lighted buoy at the W extremity of the shoal marks the N side of the entrance to a buoyed natural deepwater channel that leads from Fleming Channel around the S side of Peche Island into Lake St. Clair. The depths in Lake St. Clair at the outer end of the channel are about 8 feet.

(173) **Windmill Point Light** (42°21.5′N., 82°55.8′W.), 42 feet above the water, is shown from a white conical tower on a concrete base on the N side of the entrance to the Detroit River.

(174) **Windsor, Ont.**, is a major industrial city fronting the SE side of the Detroit River from Fighting Island NE to the head of the river.

(175) The following is extracted from **Canadian Sailing Directions CEN304, First Edition.**

(176) *Windsor Harbour (42°19′N., 83°04′W.) extends for 14 miles along the Canadian shores of Detroit River and Lake St. Clair. The SW limit of the harbour is a straight line drawn from Fighting Island North light at the International Boundary in a 046.5° direction to the shore. The NE limit of the port is the northerly extension of the east limit of the city of Windsor to the International Boundary.*

(177) *The city of Windsor, with a population of 191,435 (1991) and a metropolitan area population of 264,800, has more than 500 industries and is a major Canadian automobile manufacturing centre. Windsor is the principal outlet for Ontario agricultural products; major canning companies operating in Windsor take advantage of the extended growing season and crop varieties. Windsor is also the home of Ontario's first major casino.*

(178) *Windsor is a Customs land border reporting station for passengers, general public, and commercial highway traffic; a vessel clearing station for commercial traffic; and a vessel reporting station for pleasure craft.*

(179) *Immigration and agricultural inspection facilities are also available at Windsor.*

(180) *Windsor Harbour is administered by the Windsor Harbour Commission. Regulations, information and rates may be obtained from the office of the Commission at 500 Riverside Drive West, Windsor, Ontario N9A 5K6.*

(181) *Windsor Harbour was used by 2,822 ships, ferries and barges in 1994, with a total of 4.3 million tonnes of cargo. Commodities handled include aggregates, salt, lumber, petroleum, general cargo, grain, other dry and liquid bulk, and railroad barges.*

(182) *The normal navigation season is from April 15 to December. Depending on weather conditions, navigation may begin as early as March 20 and end as late as January 31. Local use of the harbour continues all year.*

(183) *Tugs are available locally or from Detroit. Major repairs can be carried out by Matt Shipbuilding Limited, a division of Romeo Machine Shop. There is no dry dock. Marine radar and radio repairs can be carried out by K.E.L. Communications. Garbage service, heavy lift equipment and fork lift trucks are available. Information on services can be obtained from the Harbour Master.*

(184) *(Windsor Harbour wharves are listed in the table.)*

(185) *(Shipyards in the Great Lakes area are listed in Sailing Directions booklet CEN 300, General Information, Great Lakes.)*

(186) *All types of marine supplies, stores, fresh provisions and water are available in Windsor. Complete ship bunkering services are available at the Sterling Fuels wharf.*

(187) *Windsor Harbour Commission monitors VHF Channel 14. Canadian and United States railroads service the harbour. Transport truck lines operate between Windsor and all parts of Ontario as well as the States of Michigan, Ohio, Indiana and Illinois. Windsor Airport offers connections with other airports in Canada.*

(188) *Conspicuous objects in Windsor are the chimney at Hiram Walker and Sons; the lighted Home of Canadian Club sign WSW of Belle Isle; and the church cupolas between the Ford plant and Hiram Walker and Sons.*

(189) **Detroit, Mich.**, fronts the NW side of the Detroit River from the mouth of Old Channel of River Rouge NE to the head of the river. It is a major industrial city and the center of the U.S. automobile industry. The chief waterborne commerce is in coal, petroleum products, limestone, steel, iron ore and pellets, and general and containerized cargo.

(190) **Anchorage.**–Anchorage in the Detroit River is restricted by Federal regulation. (See **33 CFR 162.136,** chapter 2, for regulations.) If weather conditions preclude passage through the river, vessels generally hold up or anchor in Lake Erie if northbound or in Lake Huron if southbound. Under stress of weather vessels occasionally anchor on the NW side of the river from 0.6 to 1.5 miles below Belle Isle.

(191) **Towage.**–Tugs to 2,200 and 2,000 hp are available for Detroit from Gaelic Tugboat Co. or Great Lakes Towing Co., respectively. Tugs of the former company moor in the River Rouge; from the latter moor about 1.3 miles S of the River Rouge, on W bank Detroit River.

(192) Arrangements for the Great Lakes Towing Co. tugs are made through the dispatcher in Cleveland at 800-321-3663 or on VHF-FM via remote antenna. The Gaelic Tugboat Co. dispatcher in Detroit is reached at 313-283-2525 or on VHF-FM channel 16.

(193) Detroit is a **customs port of entry.**

(194) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(195) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(196) **Coast Guard.**–A Marine Safety Office and a Coast Guard base are at Detroit. (See appendix for address.) Belle Isle Coast Guard Station is on the SE side of Belle Isle.

(197) **Wharves.**–Detroit has numerous deep-draft facilities along the Detroit River. (For a complete description of the port facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For information on the latest depths, contact the operators.) Most of the facilities described have rail and highway connections, and some have water and electrical shore-power connections.

(198) **Detroit Coke Corp., Detroit River Dock:** W side of the Detroit River immediately above the mouth of Old Channel; 640-foot face, 1,130 feet with dolphins; 22 feet alongside; deck height, 6 feet; open storage for 220,000 tons of coal; receipt of coal; owned and operated by Detroit Coke Corp.

## Windsor Harbour-Major Port Facilities

| Name | | Wharf length Ft (m) | Depth † ft (m) | Elevation †† ft (m) | Remarks |
|---|---|---|---|---|---|
| | | | | | **Note: All information in this table was provided by local authorities. User should consult local authorities for latest conditions.** |
| Sterling Fuels | | 1,000 (305) | 27 (8.2) | 8 (2.4) | Complete vessel bunkering facility, operation all year, 24 hours a day. |
| Windsor Harbour Commission | | | | | Open Storage area of 12 acres (5 ha) for stone, sand and bulk materials. |
| Confederation Dock | | | | | Canada Building Materials Co. cement mixing plant occupies NW corner of wharf. |
| Canada Building Materials | Slip | 760 (232) | - | | Slip not used for docking vessels. |
| | River Front | 315 (96) | 27 (8.2) | | For self-unloading vessels. |
| Windsor Harbour Commission | | | | | Open storage areas of 25 acres(10 ha) for stone, sand and bulk materials. |
| Lafarge Construction Materials | | 806 (246) | 25 (7.6) | 4 (1.2) | For self-unloading vessels. Operated by Lafarge Construction Materials. |
| Adams Cartage | Slip | 850 (259) | 16 (4.9) | | Open storage for 90,720 tonnes, also covered storage. Not in use in 1995. |
| | River front | 150 (45.7) | 25 (7.6) | 4 (1.2) | |
| Pyramid Aggregates | | 450 (137) | 20 (6.1) | 3 (0.9) | Open storage area of 150,000 sq ft (13,935 $m^2$). Not in use in 1995. |
| Premier Concrete Dock Ltd. | | 1,000 (305) | 21 (6.4) | 3 (0.9) | Used by the owners for handling building aggregates and bulk cement into silos. Open storage areas of 13.4 acres (5.4 ha). |
| Canadian Pacific Railway | | 150 (45.7) | 25 (7.6) | 4 (1.2) | Railroad ferry terminal. Ceased operations in May 1994. |
| Dieppe Park Dock | | 800 (244) | 26 (7.9) | 4 (1.2) | Owned by the City of Windsor. Used by visiting non-commercial ships. Administered by the Department of Parks & Recreation. |
| Canadian National Railways | | 36 (11) | 4 (1.2) | | Railway ferry terminal. Ceased operations. |
| Canadian Salt Co. Ltd Ojibway Mine | | 730 (223) | 26 (7.9) | 7 (2.1) | Open storage area of 300,000 sq ft (27,900 $m^2$). Road and railway connections. |
| ADM Grainco Windsor Grain Terminal | | 1,278 (389) | 27 (8.2) | 6 (1.8) | An elevator with a capacity of 105,000 tonnes of grain handles soya beans, corn wheat, or oil seeds, as well as meal from the adjacent ADM-Agir Industries Ltd. plant. Modern conveyor equipment for loading and unloading. Access to major railways and highways. |
| Morterm Limited. | Slip | 2,400 (732) | 16 to 23 ft (4.9 to 7 m) | | Terminal area of 180 acres (73 ha). Direct railway and road connections. 157,000 sq ft (14,587 $m^2$) of covered storage. 15 fork-lift trucks, 2 mobile cranes. Open storage area of 50 acres (20 ha). |
| | River front | 750 (229) | 27 (8.2) | | |
| Ontario Hydro J. Clark Keith Generating Station | | 730 (223) | 21 (6.4) | 3 (0.9) | Not in use in 1996. |
| Southwestern Sales West Dock railway | | 1,400 (427) | 21 (6.4) | 2 (0.6) | Open storage areas of 21 acres (8.5 ha). Road and connections. |
| Canadian Salt Co. Ltd. Sandwich Dock | | 410 (125) | 27 (8.2) | 4 (1.2) | Operated by the Van de Hogen Group for handling inbound shipments of lumber. |
| Kennette Contracting Co. Ltd. | | 450 (137) | 26 (7.9) | 5 (1.5) | Open storage area of 21 acres (8.5 ha) for bulk materials. Road and railway connections. Privately owned. Not in use 1995. |
| Van de Hogen Material Handling Inc. | | 410 (125) | 26 (7.9) | 4 (1.2) | Major storage and distribution centre with complete handling capabilities. 56 acres (22.6 ha) of open storage; 80,000 sq ft (7,433 $m^2$) of covered storage. |
| Coco Harbour Terminals | | 630 (192) | 28 (8.5) | 4 (1.2) | Available for receiving and storing aggregate. |
| Hiram Walker and Sons Ltd. | | 2,200 (671) | 24 (7.3) | 6 (1.8) | Private wharf receiving bulk grain from self-unloading vessel up to 750 feet (229 m) in length. |
| Ford Motor Company of Canada Ltd. | | 1,800 (549) | 8 (2.4) | | Open storage area 1,800 x 200 feet (549 x 61 m), bulk materials including sand from self-unloading vessels. Private dock. |
| Southwestern Sales East Dock | | 700 (213) | 28 (8.5) | 3 (0.9) | Bulk storage with a rubble wall. Stone and sand discharged by self-unloading vessels only. |

† Depth below chart datum. †† Elevation above chart datum.

(199) **City of Detroit, Mistersky Power Station Wharf:** 0.8 mile above Detroit Edison Co. Delray Plant Wharf; 1,049-foot face; 28 feet alongside; deck height, 6 feet; pipelines extend to tank storage, capacity 450,000 barrels; receipt of fuel oil; owned by city of Detroit and operated by Public Lighting Department.

(200) **Nicholson Terminal and Dock Co., Summit Street Dock:** W side of the river 0.9 mile below Ambassador Bridge; 480-foot face; 28 feet alongside; deck height, 6 feet; 100,000 square feet covered storage; 16 acres open storage; cranes to 200 tons; receipt and shipment of general and containerized cargo, and steel, and bulk liquids; owned by city of Detroit and operated by Nicholson Terminal and Dock Co.

(201) **Detroit Marine Terminals, Clark Avenue Wharf:** 0.6 mile below Ambassador Bridge; 2,130 feet of berthing space; 27 feet alongside; deck height, 6 feet; 25,000 square feet covered storage; 25 acres open storage; cranes to 200 tons; receipt and shipment of general and containerized cargo and steel; shipment of tallow; owned and operated by Detroit Marine Terminals, Inc.

(202) **Huron Cement Wharf:** (42°19′50″N., 83°01′45″W.); 589-foot face; 21 feet alongside; deck height, 5 feet; open storage for 30,000 tons of stone and 15,000 tons of sand; pipelines extend to storage silos for 28,000 tons of cement; receipt of limestone and bulk cement; owned by Huron Cement, division of National Gypsum Co., and operated by Huron Cement, division of National Gypsum Co., and Koening Fuel and Supply Co.

(203) **Medusa Cement Detroit Dock:** (42°19′59″N., 83°01′24″W.); 225-foot face; 28 feet alongside; deck height, 6 feet; vessels discharge into receiving hopper with conveyor to storage silos, capacity 2,900 tons, system operates at 1,500 tons per hour; receipt of bulk cement; owned and operated by Medusa Cement Co., division of Medusa Corp.

(204) **Detroit Edison, Conners Creek Coal Wharf:** (42°21′17″N., 82°57′18″W.); 420-foot face; 16 to 21 feet alongside; deck height, 5 feet; open storage for 250,000 tons of coal; pipeline extends to storage tank, capacity 125,000 barrels; receipt of fuel oil and coal; owned and operated by Detroit Edison Co.

(205) **Supplies.**–Marine supplies and provisions of all types are available at Detroit. Water is available at many of the wharves. Number 1, 2, and 6 fuel oils are available, mostly by barge, but by truck at some locations and by pipeline at the Shell Oil Co. and Texaco docks in River Rouge.

(206) **Repairs.**–Detroit has no facilities for drydocking deep-draft vessels, but medium-draft vessels may drydock at the Nicholson Terminal and Dock Co. Pier, 1.4 miles below the mouth of Short Cut Canal. Detroit Boat Basin, Inc., opposite the N side of Belle Isle, performs repairs to pleasure and occasionally small commercial craft. A 200-ton marine railway with 7 feet over the keel blocks, a 20-ton marine elevator, and machine, carpenter, welding, and paint shops are available. The largest vessel handled by the marine railway is 135 feet.

(207) **Small-craft facilities.**–Detroit has several small-craft facilities, most of which are opposite the head of Belle Isle. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, and a launching ramp are available. Hoists to 50 tons and marine railways to 200 tons are available for hull, engine, and electronic repairs.

(208) The U.S. Postal Service operates a **Marine Post Office** at Detroit. A special mail boat delivers and receives mail from vessels passing through the river, usually meeting them at the Ambassador Bridge. Arrangements can be made with 1 hour advance notice by contacting agent "Westcott" on VHF-FM channels 10 or 16.

(209) **Communications.**–Detroit has excellent rail and highway connections. The city has several airports.

# 8. LAKE ST. CLAIR

(1) **Chart Datum, Lake St. Clair.**–Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake St. Clair is an elevation of 572.3 feet (174.4 meters) above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

**Dimensions, etc.**

(2) Length, steamer track, outlet of South Channel of St. Clair River to Windmill Point Lighthouse; 18.5 miles.

(3) Length (right line), on about longitude 82°45′W.; 26 miles.

(4) Breadth (right line), on about latitude 42°25′N.; 24 miles.

(5) Water surface of lake (including Detroit River and St. Clair River); 198 square miles (U.S.), 292 square miles (Canada).

(6) Entire drainage basin (including Detroit River and St. Clair River); 3,050 square miles (U.S.), 4,370 square miles (Canada).

(7) **General description.–Lake St. Clair** is an expansive shallow basin, with low, marshy shores and a flatly sloping bottom. The lake has a greatest natural depth of 21 feet. St. Clair River flows from N and enters the N part of the lake through several channels of a wide delta area. The outflow of the lake is at the SW end through the Detroit River. The chief importance of the lake is the dredged deep-draft channel that leads across it to connect Detroit River and St. Clair River. No large commercial facilities or harbors are on the lake.

(8) **Fluctuations of water level.**–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, the lowest stages prevailing during the winter and the highest during the summer.

(9) In addition to the normal seasonal fluctuations, oscillations of irregular amount and duration are also produced by storms. Sudden changes in wind or barometric pressure can cause fluctuations of 1 foot or more that may last several hours. At other times, strong winds of sustained speed and direction drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This effect is more pronounced in bays, where the impelled water is concentrated in a small space by converging shores, especially if coupled with a gradually sloping inshore bottom which even further reduces the flow of the lower return currents. This effect is very pronounced in Anchor Bay.

(10) **Weather, Lake St. Clair and vicinity.**–Strong winds associated with squall lines or winter storms occasionally whip across Lake St. Clair causing a danger to shipping. One July, a line of thunderstorms generated a 61-knot, 1-minute windspeed recorded by a ship traversing the lake. Peak gusts at Selfridge Air National Guard Base have been clocked in the 60-knot range in spring and late fall, and in the 40- to 50-knot range at other times during the navigation season. Winds over the lake frequently blow out of the S through W, but numerous local effects come into play on this shallow body of water. At Selfridge, northerlies and northwesterlies are also frequent, particularly during the morning hours, while southeasterlies are common during spring and summer afternoons.

(11) While haze, smoke, and pollution often drop visibilities below 7 statute miles, (6.1 nm) on 9 to 13 days per month, they seldom fall to less than 0.5 statute mile (0.4 nm). Fog, the principal cause of very poor visibilities, is most likely in autumn and early spring. Visibilities of less than 0.5 statute mile (0.4 nm) occur on about 2 to 3 days per month during these periods.

(12) **Ice.**–Ice forms early on this body of water, usually starting in the shallows of Anchor Bay, along the St. Clair shores, and in the E at Mitchell Bay. Because of prevailing winds and currents, the W side of the lake is the last to become covered and the first to clear. Navigation is usually extremely limited by early December. The broken track through the lake closes quickly, but little rafting or ridging occurs. The head of the Detroit River is relatively ice-free for the entire winter, except for minor ice jams. Heaviest ice cover usually occurs in late February or early March. Thawing is rapid and is aided by the winds and currents, which move drifting floes to the head of the Detroit River, where strong river currents move them downstream. The lake is usually open by early April.

(13) **Navigation regulations.**–A vessel traffic reporting system and related navigation regulations have been established for the connecting waters from Lake Erie to Lake Huron. (See **33 CFR 162.130 through 162.140,** chapter 2, for regulations.)

(14) **Vessel Traffic Service.**–The Canadian Coast Guard operates a Vessel Traffic Service in Canadian waters from Long Point in Lake Erie through the Detroit and St. Clair Rivers to De Tour Reef Light in Lake Huron. (See Chapter 3 and the Annual Edition of Canadian Notices to Mariners for complete information.)

(15) **Pilotage.**–The waters of Lake St. Clair are Great Lakes designated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for Lake St. Clair are supplied by Lakes Pilots Association. (See appendix for address.) Pilot exchange points are just below the Ambassador Bridge in Detroit River and off Port Huron at the head of St. Clair River in about 43°05′30″N., 82°24′42″W. The pilot boat in the Detroit River, J.W. WESTCOTT II, has a black hull encircled by an orange band and a white cabin with the words "U.S. Mail" in black letters. Three pilot boats are at Port Huron; HURON BELLE has an international orange hull with an aluminum cabin, and HURON MAID and HURON LADY each have an international orange hull with a white cabin. (See Pilotage, chapter 3, and **46 CFR 401,** chapter 2.)

(16) **Charts 14850, 14853.**–The main vessel route across Lake St. Clair is through the dredged channel that leads from the head of the Detroit River NE for about 16 miles to St. Clair Cutoff Channel at the mouth of the St. Clair River. The channel is well marked throughout its length by lights and lighted and unlighted buoys, and at its lower end by a **227°45′** lighted range NE of Peche Island. A racon is at the front range light. The front range light is protected by riprap and should not be passed close aboard, even by vessels of shallow draft. **Lake St. Clair Light** (42°27.9′N., 82°45.3′W.), 52 feet above the water, is shown from a white square tower on a cylindrical base on the NW side of the

channel at the slight turn near its midpoint. A radar beacon (Racon) is at the light.

(17) In September-November 1990, the controlling depth was 25 feet (27 feet at midchannel) in the Lake St. Clair ship channel.

(18) A **dumping ground** is on the SE side of the dredged channel near its lower end. Although new dumping above a depth of 8 feet is prohibited, there are shoals considerably above that depth, and the dumping ground is considered unsafe for navigation.

(19) The W, or Michigan shore of Lake St. Clair, has been extensively developed with homes, yacht clubs, and marinas. The communities of **Grosse Pointe Park, Grosse Pointe, Grosse Pointe Farms, Grosse Point Shores,** and St. Clair Shores, suburban to Detroit, are on the W lakeshore extending from Windmill Point at the head of Detroit River N for about 10 miles. Several piers, some marked by private lights, extend as much as 0.5 mile into the lake with depths of 6 to 10 feet alongside.

(20) **Milk River** is a small river flowing into Lake St. Clair on the NW side of **Gaukler Point,** 7.5 miles N of Windmill Point. A sunken wreck is about 0.8 mile 125° from Gaukler Point. A fixed highway bridge with a clearance of 8 feet crosses the river just above the mouth. About 0.2 mile above the bridge, just below another bridge, is a series of taintor gates that control the water level upstream. The river below the gates has been developed for small-craft berthing.

(21) A boulder ledge with depths of 2 feet extends 1.5 miles NNE from Gaukler Point. Buoys mark the E and W sides of the ledge, and a lighted buoy marks the N end.

(22) **St. Clair Shores, Mich.,** extends along the lakeshore from the Milk River N for 6.5 miles. **Miller Memorial Light** (42°27.8′N., 82°52.8′W.), 260 feet above the water, is a prominent private aid shown from atop a high-rise apartment building, 0.3 mile N of the Milk River mouth.

(23) **St. Clair Shores Coast Guard Station** is 0.7 mile N of the light. A **slow-no wake speed** is enforced in the canals of St. Clair Shores and the adjacent waters of Lake St. Clair. The lakefront for about 1 mile N of Milk River has numerous large small-craft facilities. All types of marine services and supplies, including lifts to 40 tons, are available. The rest of the St. Clair Shores lakefront has private facilities with a few public parks and ramps.

(24) **Cutoff Canal** empties into the lake 7.5 miles N of Gaukler Point. The canal extends about 2 miles NW to a weir just below the junction with the Clinton River at Mount Clemens. During flood conditions, the canal diverts a major part of the flow of Clinton River. The canal has depths of 9 feet just inside the mouth, thence 6 feet to just below the weir, thence 2 feet and 1 foot below and above the weir, respectively.

(25) **Point Huron** (42°33.8′N., 82°47.1′W.) is the SE point of a projection of land that extends into Lake St. Clair NE of Cutoff Canal. **Black Creek,** on the N side of Point Huron, leads to an extensive area of privately dredged small-craft channels. The entrance to the creek is marked by private buoys and a private **297°15′** lighted range. In 1977, the reported controlling depth was 5 feet through the entrance. A **slow-no wake speed** is enforced in the creek and connecting canals. Marinas at **Metropolitan Beach** on the W side of the waterway provide transient berths, water, ice, electricity, launching ramps, and sewage pump-out. One of the marinas, **Metro Beach Metropark**, was developed by the Michigan State Waterways Commission.

(26) **Anchor Bay,** fed by North Channel of the St. Clair River, is the shallow N arm of Lake St. Clair N of Point Huron. A depth of about 8 feet can be carried across the bank that separates the S end of the bay from the main body of the lake. The best water across the bank is on a general N-S line just E of Point Huron Lighted Buoy 1PH (42°33.2′N., 82°44.9′W.). The central part of the bay has depths of about 10 feet with gradual shoaling toward the shores.

(27) **Clinton River** is a narrow crooked stream discharging into the W side of Anchor Bay about 2 miles N of Point Huron. The city of **Mount Clemens, Mich.,** is about 7.3 miles above the mouth.

## Structures across Clinton River to Mount Clemens

***Miles above Clinton River Inner Light***

****Clear width in feet proceeding upstream***

| *No.* | *Location and Name* | *Kind* | *Miles** | *Clear width in feet of draw or span openings*** | | | *Clear height in feet above Low Water Datum* | *Remarks* |
|---|---|---|---|---|---|---|---|---|
| | | | | *Right* | *Left* | *Center* | | |
| 1 | Overhead cables | Telephone | 3.48 | | | | 25 | |
| 2 | Bridgeview Ave. bridge | Highway | 3.50 | | | 50 | 21 | Fixed. |
| 3 | Overhead cables | Power | 3.52 | | | | 30 | |
| 4 | Overhead cables | Power & telephone | 5.85 | | | | 40 | |
| 5 | Overhead cable | | 5.94 | | | | | Data not available. |
| 6 | Edsel Ford Freeway I-94 bridge | Highway | 5.95 | | | 55 | 28 | Twin fixed. |
| 7 | Overhead cable | Power | 6.58 | | | | 46 | |
| 8 | Market St. bridge | Highway | 7.20 | | | 78 | 14 | Fixed. |
| 9 | Cass Ave. bridge | Highway | 7.32 | | | 64 | 20 | Fixed. |
| 10 | Overhead cable | Power | 7.45 | | | | 58 | |
| | Junction with Cutoff Canal | | 9.00 | | | | | |
| 11 | S. Broadway bridge | Highway | 9.30 | | | 74 | 15 | Fixed. |
| 12 | Overhead cable | | 9.37 | | | | | Data not available. |
| 13 | Gratiot Ave. bridge | Highway | 9.38 | | | | 14 | Fixed. Head of navigation. |

(28) **Channels.**–A dredged channel leads from Anchor Bay between two breakwaters through the mouth of the river and upstream to Mount Clemens. The S breakwater encloses a harbor basin on the S side of the channel at the mouth of the river. The entrance is marked by lighted and unlighted buoys, lights on the outer ends of the breakwaters, and a light on the N side of the river mouth. In 1992-1996, the controlling depths were 5 feet through the mouth of the river to Clinton Harbor Inner Light with shoaling to 1 foot along the N channel edge at about 42°35′42.0″N., 82°46′31.5″W., and shoaling to bare in the basin, thence 2½ feet upstream from the light to Anderson Marine with a ½ foot shoal in the S half of the channel at about 42°35′41.2″N., 82°46′38.0″W., thence shoaling to bare to Sundog Marina, thence 3 feet to Dickerson Avenue bridge with shoaling to bare in the S half of the channel approaching the bridge, thence 4 feet to Cass Avenue bridge at Mount Clemens.

(29) The controlling depth in the river above Mount Clemens is 2 feet, and the river is navigable by small boats for a considerable distance above Mount Clemens.

(30) **Fluctuations of water level.**–Winds cause day-to-day level changes of sometimes more than 1 foot. Each year, spring freshets raise the water level at Mount Clemens from 6 to 9 feet above normal.

(31) **Caution.**–The entrance channel should not be approached from the S because of an obstruction, covered 4 feet, 0.4 mile ESE of the S breakwater. Small craft are cautioned not to navigate between the dredged channel and the N breakwater, because of very shallow water.

(32) **Weather, Mount Clemens and vicinity.**–Mount Clemens, MI, is located on the northwest shore of Lake St. Clair and in the southwestern part of the state on a rather large isthmus of land that separates Lake Erie from Lake Huron. Within this isthmus lies the Detroit river which not only acts as a natural border between Ontario and Michigan, but also serves to connect Lake Erie, to the south, with Lake St. Clair to the north. On average, nine days each year has maximum temperatures in excess of 90°F (32.2°C) at Mount Clemens. July is the warmest month with an average high of 82°F (27.8°C) and an average minimum of 62°F (16.7°C). January is the coolest month with an average high of 31°F (-0.6°C) and an average minimum of 18°F (-7.8°C). The highest temperature on record for Mount Clemens is 100°F (37.8°C) recorded in September 1953 and the lowest temperature on record is -13°F (-25°C) recorded in January 1963. Every month has seen temperatures at or below 40°F (4.4°C) and every month except June, July, and August has recorded temperatures below freezing (0°C).

(33) The average annual precipitation for Mount Clemens is 27.2 inches (691 mm) which is fairly evenly distributed throughout the year. The wettest month is June with 3.0 inches (76 mm) and the driest is February with only 1.6 inches (41 mm). Snow falls on about 79 days each year and averages about 30 inches (762 mm) each year. January is the snowiest month averaging about eight inches (203 mm). Snow has fallen in every month except June through September and one-foot-plus (>305 mm) accumulations in a given month has occured in each month December through March. Fog is present on average 138 days each year and is evenly distributed throughout the year with a slight maximum in during the Autumn.

(34) The prevailing wind directions in Mount Clemens is south during the summer and southwest during the winter. The winter season and transitional months of January through April are the windiest period averaging around 12 knots. Extremes often occur in squall lines or thunderstorms. A maximum gust of 72 knots occurred in January 1949.

(35) (See page T-8 for **Mount Clemens climatological table.**

(36) A **slow-no wake speed** is enforced on the Clinton River.

(37) **Small-craft facilities.**–Numerous marinas on the Clinton River provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Hoists to 100 tons are available for hull and engine repairs.

(38) **Detroit Coast Guard Air Station** is at Selfridge Air National Guard Base on the W side of Anchor Bay N of the Clinton River. Two basins for crash rescue craft are 2.4 and 3 miles NW of the Clinton River mouth. The SE basin is protected by a detached breakwater marked by three private lights, and the NW basin is marked by a private **261°** lighted range that operates when the crash boats are deployed.

(39) The shore, N and NE of Selfridge Air National Guard Base, is indented by several small creeks and privately dredged canals developed for housing and small-craft facilities. A **slow-no wake speed** is enforced on these waterways.

(40) **Salt River** flows into the NW side of Anchor Bay about 4 miles N of the Clinton River mouth. The entrance to the river is marked by private lights on either side of the mouth and a private **018°** lighted range. In 1977, the reported controlling depth was 3 feet through the entrance upstream for 2,000 feet. Several submerged concrete remains of former light structures are in the entrance channel; caution is advised. A **slow-no wake speed** is enforced in the Salt River. Marinas in the lower part of the river provide gasoline, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, and a 40-ton hoist.

(41) **New Baltimore, Mich.,** is on the N side of Anchor Bay at the mouth of **Frog Creek** about 5.5 miles NNE of the Clinton River. A **slow-no wake speed** is enforced in Frog Creek and in the small-craft channels at New Baltimore E of the creek. Marinas at New Baltimore provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 15-ton lift is available for hull, engine, and electronic repairs.

(42) **Fair Haven, Mich.,** is a village on the NE shore of Anchor Bay at the mouth of **Swan Creek** about 4 miles E of New Baltimore. Several privately dredged canals lead to marinas off both sides of the lower part of the creek. The approach to the creek is marked by buoys. In 1977, the reported controlling depth in Swan Creek was 4 feet. A **slow-no wake speed** is enforced in the creek and canals. The marinas provide transient berths, gasoline, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. An 18-ton hoist is available for hull and engine repairs.

(43) The E side of Anchor Bay, from Fair Haven S, is a wide shallow area receiving the outflow from North Channel and Middle Channel of the St. Clair River.

(44) The mouth of the St. Clair River empties into the NE side of Lake St. Clair through numerous channels, creating a delta region. The delta region of the river, from **North Channel** SE to **St. Clair Cutoff Channel** is described in chapter 9, St. Clair River.

(45) The **International Boundary** leaves Lake St. Clair through **South Channel** of the St. Clair River. The Boundary lies along the Channel's longitudinal axis and thence along the longitudinal axis of the St. Clair River.

(46) The following is extracted from **Canadian Sailing Directions CEN304, Chapter 2, Lake St. Clair**. It is to be noted that the units of miles are nautical miles.

(47) *The Canadian north and east shores of Lake St. Clair are flat and marshy.* ***Mitchells Bay*** *(42°28′N., 82°26′W.) is in the NE*

*corner of the lake between **Mitchells Point** and **St. Anne Island**. The buoys in the approaches to Mitchells Bay are reported to be moved to mark the best channel. The settlement of **Mitchells Bay**, population 172 (1981), is on the east side of the bay.*

(48) *Mitchells Bay Sector Light (717) is shown at an elevation of 32 feet (9.8 m) from a white square skeleton tower, 21 feet (6.4 m) high, with a fluorescent-orange triangular daymark. The white sector indicates the preferred channel.*

(49) ***Landmarks**.–A water tower 0.3 mile NE of Mitchells Bay Sector light is white in colour and marked Mitchells Bay. It is visible from 10 miles on all approaches. A radio tower 3.5 miles SSE of Mitchells Point is a red and white skeleton tower, 230 feet (70.1 m) high, with air obstruction lights.*

(50) *The **Public wharf** at Mitchells Bay had depths of less than 1 foot (0.3 m) in 1994. Most of the wharf is intended as a lookout for pedestrian traffic; an iron railing prevents access to the water. The inner end of the SE side of the wharf allows boaters to embark and disembark. There is no dredged channel to the **Public wharf**. There are five flag poles on the wharf, and a small convenience store with a pay phone is near by.*

(51) ***Caution**.–In 1994 there were 16 piles, with elevations of 11 feet (3.4 m), along the south side of the wharf, 1 foot (0.3 m) off the wharf face. There were also 2 piles with elevations of 1 foot (0.3m), one at the SW corner and one along the west face of the wharf; these latter piles may be submerged at high water levels.*

(52) *The municipal Peace Park, just north of the Public wharf, has three small launching ramps for rowboats or canoes.*

(53) *Marine Park, a St. Clair Parkway Commission marina, had depths of 2 to 3 feet (0.6 to 0.9 m) in 1994 and offered dockage with power and water, pump out, ramp, some boat hardware, fishing boat rentals, camping, picnic area, pay phone, showers, laundromat, snack bar, restaurant and licensed dining room, bait, tackle, ice and gasoline, and monitored VHF Channels 16 and 68. Several small spar buoys marked the channel to the marina.*

(54) *There is a crib, awash, on the SE side of the channel to the marina. This crib is at the outer end of a water intake pipeline.*

(55) ***Caution**.–In 1994, the approaches to the following marinas dried at chart datum.*

(56) *Mitchells Bay Sportsman Camp, south of the **Public wharf** at Mitchells Bay, in 1994 offered dockage with power and water, pump out, ramp, camping, picnic area, pay phone, showers, bait, tackle, ice and gasoline. The entrance channel was buoyed.*

(57) *Vincents Guide Service, on **Patricks Cove** on the SE side of Mitchells Bay, had depths of 2 feet (0.6 m) at the wharves in 1994 and offered dockage with power and water, pump out, small boat rentals and fishing charters, water taxi service, picnic area, showers, bait, ice, gasoline and winter ice fishing.*

(58) *Waterway Camp, on the east shore in a canal off Patricks Cove, in 1994 offered dockage with power and water, ramp, small boat and motor rentals, camping, picnic area, pay phone, showers, snack bar, some groceries, bait, ice and gasoline.*

(59) *Lakeshore Marina, in a shallow dredged channel at St. Luke, 3 miles south of Mitchells Point, in 1994 offered dockage, ramp, small boat rentals, some boat hardware, picnic area, snack bar, bait, tackle, drinking water, ice and gasoline.*

(60) *George Klein's Boat Ramp, up a shallow creek 3.5 miles south of Mitchells Point, in 1994 offered a ramp, small boat rentals, some boat hardware, bait, tackle, tent and trailer camping, picnic area, showers, drinking water and ice.*

(61) ***Second Channel** (not named on the chart), 50 feet (15.2 m) wide, has been dredged into Mitchells Bay from the entrance to **Chenal Ecarte** at **Martin Island** (42°28′N, 82°27′W). Second Channel is marked by buoys and had a depth of 1 foot (0.3 m) in 1994.*

(62) *Martin Island Sector light (719), on the east end of Martin island, is shown at an elevation of 37 feet (11.3 m) from a white square skeleton tower, 31 feet (9.4 m) high, with a fluorescent-orange triangular daymark. The white sector indicates the preferred channel through Second Channel, leading to Chenal Ecarte.*

(63) *Another channel, 1 mile east of Martin Island, leads from the cut outside Mitchells Bay **Public wharf** to Chenal Ecarte. The channel had a depth of 3 feet (0.9 m) in 1994 and was buoyed up to Chenal Ecarte, where a depth of 52 feet (15.8 m) was found. In 1994 this channel was weedy.*

(64) **Rankin Creek** *(not named on the chart) enters the NE side of Mitchells Bay.*

(65) *Bass Haven Marina, on Rankin Creek, had depths of up to 1 foot (0.3 m) in 1994 and offered dockage, ramp, fishing boat rentals, camping, pay phone, showers, snack bar, bait, tackle, propane, drinking water, ice and gasoline, and monitored VHF Channels 16, 68 and 71.*

(66) ***Caution**.–The dredged channels in Mitchells Bay are subject to silting. Dredging is done by priority and may be infrequent.*

(67) *In 1996, a row of 21 piles with elevations of 8 to 10 feet (2.4 to 3 m) covered a distance of 3 miles in a NW-SE direction off the mouth of **Bassett Channel**. These piles had signs warning of the fishing and hunting grounds of **Walpole Island First Nation**. There was a row of 5 similar piles in the NW part of Mitchells Bay.*

(68) **Thames River** *(42°19′N, 82°27′W) flows into the SE end of Lake St. Clair; it is reached through a dredged channel 1.3 miles long. The river is navigable by small craft as far as **Louisville**, which is 23 miles upstream.*

(69) *The entrance to Thames River is marked by spar buoys; these may be moved to mark the best channel. A least depth of 6 feet (1.8 m) was found in the buoyed channel in 1994. From the mouth of Thames River, upstream for the 4.5 miles to St. Peters Church (42°21′N, 82°20′W), which is on the south bank, mid-channel depths were 6 to 15 feet (1.8 to 4.6 m) in 1994; this part of the river is 400 feet (121.9m) wide.*

(70) ***Caution**.–The entrance channel is subject to silting and is reported to be maintained by dredging.*

(71) *Thames River range lights, in line bearing 147°*, lead into the mouth of the river. The front light (712), close NW of the ***Public wharf**, is shown from a white circular tower, 20 feet (6.1 m) high, with a fluorescent-orange triangular daymark with a black vertical stripe. The rear light (713) is shown from a white circular tower with red upper part.*

(72) *Thames River light buoy T (711.5) lies 1.9 miles NW of the front range light.*

(73) *There is a **Public wharf** on the south side of the river between the Thames River range lights. The outer face is 185 feet (56.4 m) long; in 1994, there were depths of 8 to 13 feet (2.4 to 4 m) around the outer end. There is a shallow launching ramp SE of the wharf.*

(74) *A **Canadian Coast Guard Inshore Rescue Boat** is based at Thames River from the end of May to early September each year, though these dates are subject to change (see information on Search and Rescue in Canadian Sailing Directions booklet CEN 300, General Information, Great Lakes).*

(75) *The Boating Restriction Regulations provide a speed limit of 8 km/hr (4.3 knots) on Thames River from Lake St. Clair to a position close downstream of Chatham, which is 16.7 miles upstream.*

(76) *Submerged cables, water mains and gas mains cross the river between its mouth and the city of* ***Chatham****. In 1995, it was reported that an overhead power line also crosses the river.*

(77) **Baptiste Creek** *enters the south side of Thames River 0.8 mile from its mouth. A cut on the south side 0.4 mile farther up river is dredged through the flat low land to the* ***Jeannettes Creek*** *station of the Canadian National Railways. The mouth of Jeannettes Creek is 0.6 mile beyond this cut. Between Baptiste Creek and Jeannettes Creek, the SE shore of the river is low and marshy and the banks are lined with willows; there are many logs and deadheads. There are waterfront residential properties on the west shore past Baptiste Creek.*

(78) *An abandoned wharf was reported in 1995 on the river just west of the dredged cut leading to Jeannettes Creek Station. Also reported was a concrete launching ramp at the downstream end of the wharf.*

(79) *Thames River Yacht Club, a private club on the SW side of Thames River, 0.1 mile from the entrance, had depths of 3 feet (0.9 m) in 1994.*

(80) *Radlin's Marina, on the south side of the river 0.3 mile from the mouth, had depths of 3 to 4 feet (0.9 to 1.2 m) in 1994 and offered dockage with power and water, pump out, boat hardware, salvage, camping, picnic area, pay phone, showers, bait, tackle, groceries, ice and gasoline, and a licensed British-style pub.*

(81) *Cove Marina, at the end of the third canal from the lake on the SW side of the river, 0.3 mile from the mouth, had depths of 13 feet (4 m) in 1994 and offered dockage with power and water, pump out, ramp, engine and hull repairs, 30 tonne hoist, picnic area, pay phone, swimming pool, showers, snack bar, restaurant with licensed dining room, some groceries and ice, and monitored VHF Channel 68.*

(82) *Luken Marina, on the south side of Thames River at the mouth of Baptiste Creek, had depths of 1 to 3 feet (0.3 to 0.9 m) in 1994 and offered dockage with power and water, pump out, engine repairs, salvage work, 15 tonne hoist, camping, picnic area, showers, ice, gasoline and diesel fuel.*

(83) *(There is no chart coverage of Thames River east of longitude 82°22.4'W.)*

(84) ***Prairie Siding****, a station on the Canadian National Railways, is on the south shore of the river 7 miles from the lake, where the river makes a sharp horseshoe bend.*

(85) *A swing bridge crosses Thames River 7.7 miles from the mouth. Upbound traffic uses the SE channel; downbound vessels use the NW channel. The bridge opens on demand from 0900 to 1800, Sunday to Thursday, and 0900 to 2100, Friday, Saturday, statutory holidays and Sundays of statutory holidays. The bridge has a clearance of 20 feet (6.1 m) when closed.*

(86) *The city of* ***Chatham****, with a population of 43,557 (1991), is on Thames River 16.7 miles from the entrance. Chatham is a thriving manufacturing city and the centre of a rich farming district.*

(87) *The river is 200 feet (61 m) wide through Chatham. The river front is accessible by boat; depths along the* ***Public wharves*** *were 1 to 6 feet (0.3 to 1.8m) in 1994.*

(88) *A municipal marina at Chatham offered fuel and overnight dockage in 1994.*

(89) **Stoney Point** *(42°19'N., 82°33'W.) is a low, wide point 7 miles east of Belle River. It is wooded, with homes and open areas along the shore. The trees are 35 to 50 feet (10.7 to 15.2 m) in height, giving the land a higher appearance. The community of* ***Stoney Point****, population 1,090 (1981), lies 0.6 mile SSE of the point.*

(90) *A church spire at Stoney Point is 131 feet (39.9 m) high and can be seen north and east of the point; the spire has a cross with red lights.*

(91) *A submerged water intake at Stoney Point extends 0.7 mile offshore; the crib at the outer end has a depth of 3 feet (0.9 m).*

(92) *Stoney Point Marina had depths of 1 foot (0.3 m) in 1994 and offered dockage, ramp, repairs (including propellers), boat hardware, salvage, paddleboat and small boat rentals, picnic area, bait, tackle, snack bar, water, ice and gasoline.*

(93) **Ruscom River** *(42°18'N., 82°37'W.), which flows into Lake St. Clair 4 miles east of Belle River, is subject to silting. The entrance channel had a depth of 1 foot (0.3 m) in 1994 and was marked by eight buoys, four on each side; these buoys are reported to be moved to mark the best approach. A privately maintained light is shown at a height of 20 feet (6.1 m) from a flagpole at the west side of the entrance to Ruscom River.*

(94) *The Canadian National Railways bridge, 0.1 mile from the entrance, and the highway bridge, 0.3 mile farther south, have vertical clearances of 10 feet (3 m).*

(95) *The Boating Restriction Regulations provide a speed limit of 9 km/hr (4.9 knots) on Ruscom River from its mouth to a second railway bridge, 1.2 miles upstream.*

(96) *JR's Sunset Grill and Marina, on the east shore near the mouth of the river, had depths of 1 foot (0.3 m) in 1994 and offered dockage with power and water, pump out, ramp, pay phone, licensed restaurant, ice and gasoline.*

(97) *Deerbrook Marina, on the west side of Ruscom River 0.2 mile south of the lake, had depths of 2 to 3 feet (0.6 to 0.9 m) in 1994 and offered dockage with power and water, pump out, ramp, 18 tonne hoist, boat hardware, repairs and salvage work, small boat rentals, picnic area, camping, pay phone, snack bar, bait, tackle, propane, ice and gasoline.*

(98) *Several overhead power cables span the boat canals branching south from the marina basin on Ruscom River.*

(99) **Belle River** *(42°18'N., 82°43'W.) lies 3 miles east of Puce River. The town of Belle River, with a population of 4,298 (1991), is near the mouth of the river.*

(100) *The entrance to Belle River is protected on its east side by a wall 0.3 mile long. The outer part of this wall is a curving boulder breakwall protecting the entrance to a marina that lies on the east side of the wall. A sheet steel piling wall on the west side of the river mouth extends 225 feet (69 m) from shore. There is a starboard hand daymark on the outer end of the west wall.*

(101) ***Caution****.–The entrance channel to Belle River is subject to silting; in 1994, an area awash was found in the entrance channel. Belle River Pier light (711), on the outer end of the boulder extension of the east entrance wall, is shown from a white circular tower, 24 feet (7.3 m) high, with a red upper part.*

(102) *The railway and highway bridges across Belle River have vertical clearances of 9 and 7 feet (2.7 and 2.1 m), respectively.*

(103) ***Landmarks****.–A water tank at Belle River is 125 feet (38.1 m) high with an elevation of 131 feet (39.9 m); the tank is painted green, with the words Belle River in large black letters, and stands on four circular pillars. There is a group of four silos 1 mile east of Belle River. A microwave tower 2.2 miles SE of Belle River Pier light has an elevation of 256 feet (78 m); a microwave tower 1.2 miles farther SE has an elevation of 296 feet (90.2 m); a microwave tower 1.5 miles west of Belle River has an elevation of 210 feet (64 m). These towers have air obstruction lights.*

(104) ***A submerged pipeline 0.2 mile east of the Belle River entrance extends 0.3 mile offshore; the crib at the outer end has a depth of 4 feet (1.2 m).***

(105) *Belle River Marina, on the east side of the entrance to Belle River, had depths of 4 to 6 feet (1.2 to 1.8 m) in 1994 and offered dockage with power and water, pump out, ramp, picnic area, pay phone, showers, laundromat, snack bar, ice and gasoline.*

(106) *City Limits Marina, on the west side of Belle River downstream of the railway bridge, had depths of 3 feet (0.9 m) in 1994 and offered dockage with power outlets, ramp, personal watercraft rentals, picnic area, pay phone, ice, snack bar and restaurant. In 1994, the property and ramp were floodlit.*

(107) *R and D Tackle Mooses Marina, on the west side of Belle River between the bridges, had depths of 3 feet (0.9 m) in 1994 and offered dockage, ramp, boat hardware, engine repairs, motel accommodation, picnic area, a full line of bait and tackle, snack bar, water, ice and gasoline.*

(108) **Puce River** *(42°18′N., 82°47′W.) is a small stream 3 miles ESE of Pike Creek. The entrance is between two sheet steel piling walls 80 feet (24.4 m) apart.*

(109) ***Caution**.–The entrance to Puce River is subject to silting. In 1994, 2 feet (0.6 m) could be carried as far as Puce River Harbour, where depths shoaled to 1 foot (0.3 m). Six privately maintained buoys are reported to mark the best channel.*

(110) *Riviere aux Puces light (710.3), on the north end of the wall on the west side of the river entrance, is shown at an elevation of 20 feet (6.1 m) from a white mast.*

(111) *A Canadian National Railways bridge crossing Puce River 0.1 mile from the lake has a vertical clearance of 9 feet (2.7 m); a highway bridge close upstream has a vertical clearance of 7 feet (2.1m).*

(112) **Puce River Harbour**, *on the west shore of Puce River north of the bridges, had depths of up to 2 feet (0.6 m) in 1994 and offered dockage with power and water, pump out, ramp, 20 tonne hoist, boat hardware, engine and hull repairs, salvage, personal watercraft rentals, picnic area, pay phone, showers, restaurant and licensed dining room, bait, tackle, stove alcohol, ice and gasoline. Shoreline Marine, on the premises, offered boat sales and repairs.*

(113) **Pike Creek** *(42°19′N., 82°51′W.) is a small stream entering Lake St. Clair 3.8 miles ESE of Peche Island. The entrance to the creek, between training walls, is 40 feet (12.2 m) wide. A highway bridge crossing Pike Creek 0.4 mile from the entrance has a vertical clearance of 7 feet (2.1 m).*

(114) *In 1994, a depth of 1 foot (0.3 m) could be carried as far upstream as the highway bridge, though the entrance was weedy. Privately maintained buoys mark the channel; these buoys are reported to be moved to indicate the best approach.*

(115) ***Caution**.–Pike Creek has a sand and silt bottom and is subject to silting.*

(116) *Pike Creek Entrance light (710.2), on the east side of the harbour entrance, is shown at an elevation of 17 feet (5.2 m) from a green mast with a port hand daybeacon.*

(117) *Pike Creek light (710.1), on the outer end of the west training wall, is shown at an elevation of 20 feet (6.1 m) from a white mast. This light is privately maintained.*

(118) ***Landmarks**.–A spherical-shaped water tower 1 mile SSE of Pike Creek light has an elevation of 142 feet (43.3 m) and is floodlit. A water tower 2 miles ESE of Pike Creek is painted blue and yellow, though in 1994 the paint was faded; this water tower is marked Township of Maidstone and has air obstruction lights. This second tower is prominent from offshore but is hidden from some directions when within 1 mile of shore.*

(119) *South Port Sailing Club, a private club and sailing school on the west side of Pike Creek, 0.1 mile from the mouth, had depths of 2 feet (0.6 m) in 1994.*

(120) *Ted Dudley's Marina, on the east side of Pike Creek, 0.4 mile from the mouth, had depths of 1 to 2 feet (0.3 to 0.6 m) in 1994 and offered dockage with power and water, ramp, and 10 tonne hoist.*

(121) *Pud's Place Marina, on the west side of Pike Creek, 0.5 mile from the mouth, had depths of 1 to 2 feet (0.3 to 0.6 m) in 1994 and offered dockage with power and water, pump out, 10 tonne hoist, boat hardware, engine and hull repairs, salvage, canoe and small boat rentals, picnic area, pay phone, showers, snack bar, bait, tackle, ice and gasoline, and monitored VHF Channels 16 and 68.*

# 9. ST. CLAIR RIVER

(1) **Chart Datum, St. Clair River.**–Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to the sloping surface of the river corresponding to a Lake Huron stage of 577.5 feet (176.0 meters) and a Lake St. Clair stage of 572.3 feet (174.4 meters) above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985), which elevations are the planes of Low Water Datum for the two lakes. (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

(2) **General description.–St. Clair River** is about 39 miles long from Lake St. Clair via St. Clair Cutoff Channel and South Channel to the head of the river at Lake Huron. The lower 11 miles of the river is a broad delta through which numerous channels flow into Lake St. Clair. St. Clair Cutoff Channel and South Channel form the main navigation route through the delta and connect with the dredged channel across Lake St. Clair. The upper river, above Chenal Ecarte, is generally a single deep channel, except where obstructed by Fawn Island and Stag Island. The banks of the river are clay and sand and usually quite steep.

(3) **Canadian Waters.**–St. Clair Flats Canal is immediately W of the **International Boundary**, i.e., is in U.S. waters. At the lower end of South Channel, the **International Boundary** is almost centerline of the channel and when proceeding upstream the Boundary stays approximately centerline the full length of the St. Clair River to its head at Lake Huron.

(4) **Channels.**–The channel through St. Clair River has been improved in places by dredging. The Federal project depth in the river is 27 feet.

(5) **Fluctuations of water level.**–Each year the St. Clair River has a seasonal rise and fall of about 1 foot, generally in consonance with the seasonal variations of Lake Huron. High winds may cause rapid fluctuations of up to 2 feet above or below normal.

(6) **Currents, St. Clair River.**–The following currents are based on averages of water flow through the entire cross section of the river, that is from bank to bank and from the surface to the bottom during normal flow conditions. Normal water flow conditions are encountered when there is no wind, Lake Huron is at a stage of 578.9 feet (176.4 meters), and Lake St. Clair is at a stage of 573.9 feet(174.9 meters) above mean water level at Rimouski, Quebec, on InternationalGreat Lakes Datum 1985 (IGLD 1985), that is 1.4 feet (0.4 meter) and 1.6 feet(0.5 meter above their respective Low Water Datums. The current encountered at midstream is usually about 1.5 times the average velocity. Greater velocities may be expected when the difference between the lake levels is greater, or the lake stages are higher.

(7) Currents for the following locations in the St. Clair River are given at high water flow of 230,000 cubic feet per second (cfs), medium water flow of 188,000 cfs, and low water flow of 130,000 cfs, respectively.

(8) Algonac: 2.0 mph (1.7 knots), 1.6 mph (1.4 knots), and 1.3 mph (1.1 knots)

(9) Port Lambton: 2.0 mph (1.8 knots), 1.7 mph (1.5 knots), and 1.3 mph (1.1 knots)

(10) Marine City: 2.0 mph (1.7 knots), 1.6 mph (1.4 knots), and 1.3 mph (1.1 knots)

(11) St. Clair: 2.1 mph (1.9 knots), 1.8 mph (1.5 knots), and 1.4 mph (1.2 knots)

(12) Marysville: 1.9 mph (1.7 knots), 1.6 mph (1.4 knots), and 1.3 mph (1.1 knots)

(13) Point Edward: 3.9 mph (3.4 knots), 3.3 mph (2.9 knots), and 2.5 mph (2.2 knots).

(14) The rapids section extends from about 1,000 feet above to 200 or 300 feet below the Blue Water Bridge. During periods of sustained high N to NE winds on Lake Huron, velocities in the upper St. Clair River are increased.

(15) **Ice.**–The only need for icebreaking in the St. Clair River occurs when the ice bridge that forms across the S end of Lake Huron breaks and the broken mass of ice travels down the river to the lower end where it meets the natural ice cover and forms a massive ice jam. When this occurs, ice can clog the entire 27-foot depth of the channel and cause serious flooding. (See Winter Navigation, chapter 3.)

(16) **Navigation regulations.**–The State of Michigan enforces the following speed limits for recreational craft within its jurisdictional boundaries from the mouth of Black River downsteam to the mouth of St. Clair River: slow-no wake for vessels less than 26 feet long within 200 feet of any shore, dock, or pierhead, and slow-no wake for vessels 26 feet or longer within 600 feet of any shore, dock, or pierhead.

(17) A vessel traffic reporting system and related navigation regulations have been established for the connecting waters from Lake Erie to Lake Huron. (See **33 CFR 162.130 through 162.140,** chapter 2, for regulations.)

(18) **Pilotage.**–The waters of St. Clair River are Great Lakes designated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for St. Clair River are supplied by Lakes Pilots Association. (See appendix for address.) Pilot exchange points are just below the Ambassador Bridge in Detroit River and off Port Huron at the head of St. Clair River in about 43°05′30″N., 82°24′42″W. The pilot boat in Detroit River, J.W. WESTCOTT II, has a black hull encircled by an orange band and a white cabin with the words "U.S. Mail" in black letters. Three pilot boats are at Port Huron: HURON BELLE has an international orange hull with an aluminum cabin, and HURON MAID and HURON LADY each have an international orange hull with a white cabin. (See Pilotage, chapter 3, and **46 CFR 401,** chapter 2.)

(19) **Charts 14850, 14852, 14853.–St. Clair River** flows S from Lake Huron and empties into the NE side of Lake St. Clair. The mouth of the river is an extensive delta providing numerous outlets into the lake.

(20) The following is extracted (partial) from **Canadian Sailing Directions CEN304, Chapter 3, St. Clair River**. It is to be noted that the units of miles are nautical miles.

(21) **Chenal Ecarte** *(also known as **The Snye**), branches eastwards from St..Clair River at **Baby Point** (42°38′N., 82°30′W.), 1.8 miles NNE of Russell Island. The main route to **Wallaceburg** is via Chenal Ecarte and **Sydenham River**, which flows into Chenal Ecarte 6 miles SE of Baby Point. Consult the appropriate local authority, which is the Base Manager, Canadian Coast*

**St. Clair River, head of**

*Guard Base, Amherstburg, Ontario, for the latest depth information.*

(22) *The Boating Restriction Regulations provide a speed limit of 8 km/h (4.3 knots) on Chenal Ecarte and Sydenham River as far as Dresden, which is 10 miles east of Wallaceburg. This speed limit reduces wake damage to dykes and low farmland.*

(23) *The current in Chenal Ecarte sets east and south from St. Clair River to Lake St. Clair. Rates of up to 1.2 knots have been reported in Chenal Ecarte where it leaves St. Clair River.*

(24) *Chenal Ecarte range lights, in line bearing* ***138.5°****, are on the south shore of Chenal Ecarte near its junction with St. Clair River. The front light (746) is shown from a white circular tower, 12 feet (3.7 m) high, with a fluorescent-orange triangular daymark with a black vertical stripe. The rear light (747) is shown from a white circular tower, 26 feet (7.9 m) high, with a fluorescent-orange triangular daymark with a black vertical stripe. The lights are visible only on the range.*

(25) *There are twelve daybeacons from 1 mile inside the north entrance of Chenal Ecarte to the Sydenham River junction; eight of these are starboard hand and four port hand. Most of these daybeacons mark turns in the channel.*

(26) *There are facilities for small craft on the north side of Chenal Ecarte, 0.4 mile east of the junction with St. Clair River.*

(27) *St. Clair Boating and Marine had depths of 6 feet (1.8 m) in 1994 and offered dockage with power and water, pump out, ramp, boat hardware, repairs and salvage, 20 tonne hydraulic trailer, new and used boat and motor sales and service, water taxi service, picnic area, pay phone and showers.*

(28) *Ecarte Marine had depths of 6 feet (1.8 m) in 1994 and offered dockage with power and water, pump out, ramp, repairs and salvage, 20 tonne hoist, mast stepper, new and used boat and motor sales and service, water taxi service, picnic area, pay phone, showers, laundromat, boat hardware, ice and gasoline, and monitored VHF Channel 68.*

(29) *The swing bridge on Chenal Ecarte at Walpole Island village is operated by the Department of Indian Affairs and Northern Development. ... The bridge has a vertical clearance in a closed position of 14 feet (4.3 m); the channel leads each side of the central pier.*

(30) *Two submerged cables cross Chenal Ecarte 0.15 mile NW of the swing bridge; there are other submerged power cables near the bridge.*

(31) *A water tower 0.8 mile WSW of the swing bridge is painted blue and has an elevation of 164 feet (50 m).*

(32) *At a point 5 miles from the St. Clair River end of Chenal Ecarte,* ***Johnston Channel*** *flows south, winding and narrow, for 11.5 miles to the marshy flats of Lake St. Clair.*

(33) *The Boating Restriction Regulations provide a speed limit of 8 km/h (4.3 knots) on Johnston Channel from* 42°34′N. to its junction with Chenal Ecarte.

(34) *The marshy land lying east of Johnston Channel is* ***St. Anne Island****; this is an Indian reserve.*

(35) *The distance from St. Clair River to* ***Sydenham River*** *(42°34′N., 82°25′W.) by Chenal Ecarte is 8.5 miles. From this point, Chenal Ecarte winds southward for 8 miles to its Lake St. Clair outlet at* ***Martin Island*** *in Mitchells Bay.*

(36) ***Caution****.–Two cable ferries on Chenal Ecarte carry farm produce and farm vehicles; one is 1.2 miles NW of the Sydenham River junction, and the other is 1.7 miles south of the junction. To avoid striking the submerged cables, vessels are cautioned to keep well clear of the ferry when it is in transit.*

(37) ***Blue Water Shiloh Park****, on Chenal Ecarte 1 mile NW of the junction with Sydenham River, had depths of 2 to 7 feet (0.6 to 2.1 m) in 1994 and offered dockage, ramp, canoe rentals, tent and trailer camping, picnic area, pay phone, drinking water, showers, laundromat, ice and snack bar.*

(38) *An overhead power cable with a clearance of 20 feet (6.1 m) is reported to cross Chenal Ecarte 1.5 miles below the junction with Sydenham River.*

(39) *There is a conspicuous microwave tower 0.8 mile NNW of the Chenal Ecarte junction; it is a red and white skeleton tower, 262 feet (79.9 m) high and elevation 308 feet (94 m), with air obstruction lights.*

(40) *A submerged pipeline crosses* ***Sydenham River*** *0.7 mile NE of the Chenal Ecarte junction.*

(41) *A Public wharf on the NW shore of Sydenham river, 1.2 miles NE of the Chenal Ecarte junction, is 134 feet (40.8 m) long with an elevation of 9 feet (2.6 m). In 1994, the wharf had a least depth of 10 feet (3 m) and was in a state of disrepair, with a group of piles 3 feet dry (0.9 m dry) at the south outer corner and piles awash at the north outer corner. There are no facilities at the wharf, and the land adjacent to it is overgrown (1994). There is a turning basin close upstream of the wharf.*

(42) *The Seys Grain Elevator berth is on the SE shore, opposite the Public wharf. This berth is 450 feet (137.2 m) long and consists of a 6 wooden dolphins with elevations of 13 feet (4 m); there were depths of 13 to 18 feet (4 to 5.5 m) in 1994, and it was reported that no ships had used the berth in recent years.*

(43) *The town of* ***Wallaceburg****, with a population of 11,846 (1991), is on Sydenham River 2.3 miles NE of the Chenal Ecarte junction. The river at Wallaceburg is 200 feet (61 m) wide.*

(44) *A CSX Transportation railway swing bridge crosses the river at Wallaceburg; there is a width of 50 feet (15.2 m) between the channel piers. This bridge remains open except when closed for railroad traffic. A pedestrian lift-bridge crosses the river 0.5 mile north of the railway bridge. The Lord Selkirk highway swing bridge lies between the railway bridge and the pedestrian bridge. There is a swing bridge for highway traffic at Libby Street and Baseline Road, 0.5 mile downstream of the railway bridge; its opening schedule is planned to coincide with that of the Lord Selkirk bridge.*

(45) *There is a berthing area and slip on the SE shore upstream of the Libby Street and Baseline Road swing bridge. In 1996, this slip was being developed as a marina and was reported to have depths of 3 to 4 feet (0.9 to 1.2 m).*

(46) *Wallaceburg is a* ***Customs vessel reporting station*** *for pleasure craft.*

(47) *Wallaceburg Municipal Marina offered overnight dockage at 8 locations in downtown Wallaceburg in 1994; most of these wharves are on the NW shore between the Lord Selkirk bridge and the pedestrian bridge, with depths, at the James Street wharf, of 4 to 14 feet (1.2 to 4.3 m). Power at the docks, showers, ice, and picnic areas with barbecues were also available. All the facilities of the town are within walking distance.*

(48) *There is a launching ramp on the SE shore at the foot of Wallace Street and Huron Street.*

(49) **St. Clair Cutoff Channel,** the main vessel route through the St. Clair River delta, extends ENE from the N end of Lake St. Clair ship channel for about 6 miles between **Seaway Island** and Bassett Island to its junction with South Channel at the SE end of Harsens Island. The channel is maintained by the Canadian Government and is well marked by lighted and unlighted buoys, lights, and a **064°15′** lighted range on Squirrel Island.

(50) Three diked disposal areas are on the SE side of Seaway Island. Barge landing docks are at the center and E areas. The center and E disposal areas are each marked by a light.

(51) **St. Clair Flats Canal** extends from the N end of Lake St. Clair ship channel NE for about 1.7 miles along the SW end of Seaway Island to the junction with South Channel. The canal is marked by lighted and unlighted buoys, a light, and a **041°** lighted range. **South Channel** extends from the N end of St. Clair Flats Canal along the NW side of Seaway Island and bends E along the S shore of **Harsens Island, MI** to the junction with St. Clair Cutoff Channel at **Southeast Bend.** This section of South Channel is well marked by lights.

(52) St. Clair Flats Canal and South Channel below Southeast Bend have good available depths but have not been maintained for deep-draft navigation since completion of St. Clair Cutoff Channel. The U.S. side of South Channel has been extensively developed with summer cottages and small-craft landings.

(53) **Caution.**–The earth dike along the SE edge of St. Clair Flats Canal S entrance is reported to be submerged during periodic high water conditions. It is reported that several small boats have struck the dike when it was submerged. A large dayboard with the words Danger Submerged Jetty marks the approximate point where the jetty submerges.

(54) From the junction with St. Clair Cutoff Channel, South Channel leads NNE for about 6.5 miles to the junction with North Channel. The channel is well marked by lighted and unlighted buoys, lights, and lighted ranges, and is maintained at the Federal project depth of 27 feet.

(55) **Currents.**–Vessels transiting South Channel are advised to favor the E side of the channel N of Russell Island, because the current flows strongly from the main river channel into North Channel.

(56) **Russell Island, MI,** is on the W side of South Channel just below the junction with North Channel. A shallow bank extends about 0.5 mile NNE from the head of the island. A lighted buoy marks the NE side of the shoal.

(57) **North Channel,** the northwesternmost part of the St. Clair River delta, branches W from the river just N of Russell Island, flows along the N side of Harsens Island and **Dickinson Island,** and empties into the E side of Anchor Bay. The outlet of the channel in the shallow water of Anchor Bay is well marked by buoys. Two irregularly shaped diked disposal areas front the channel on the N side of Dickinson Island.

(58) **Chenal A Bout Rond** branches SW from North Channel at the W end of Dickinson Island and flows into Anchor Bay.

(59) **Middle Channel** leads SW from North Channel between Harsens Island and Dickinson Island. The outlet in Lake St. Clair is marked by lighted and unlighted buoys. A 22-acre diked disposal area is on the W side of Harsens Island about 1.2 miles below the junction with North Channel.

(60) **Algonac, Mich.,** is a summer resort at the head of North Channel opposite Russell Island. Marinas at Algonac provide transient berths, gasoline, water, ice, electricity, marine supplies, and a launching ramp. A 20-ton hoist is available for hull and engine repairs. Ferries operate from Algonac to Harsens Island, Russell Island, and Walpole Island, Ont.

(61) Algonac is a **customs station.**

(62) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(63) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(64) A **slow-no wake speed** is enforced on the channels and canals at Algonac.

(65) **Ferry.**–A ferry landing is on the NW side of Walpole Island, Ont., opposite the upper end of Russell Island, MI. Breakwaters protect the 105-foot wharf on the N and S sides. A light marks the W end of the detached N breakwater. A ferry operates from the wharf to Algonac, MI.

(66) From the junction with North Channel, the dredged channel of the St. Clair River extends upstream for about 7 miles to a point about 1.3 miles above Fawn Island. The channel passes W of Fawn Island and is well marked by lighted buoys and lights. The channel is maintained at the Federal project depth of 27 feet.

(67) **Port Lambton, Ont.,** a village on the E side of the river about 1 mile above the junction with Chenal Ecarte, has a 125-foot Government wharf with a reported depth alongside of about 12 feet. A ferry operates from the wharf across the river to Roberts Landing. A marina is close S of the Government wharf. A **Canadian customs vessel reporting station** is at Port Lambton.

(68) **Roberts Landing, Mich.** is on the W side of the river 3 miles above Russell Island. A ferry operates across the river to Port Lambton.

(69) About 1.7 miles above Port Lambton, a shoal with a least depth of 15 feet is in midriver along the E limit of the dredged channel. A lighted buoy off the S end of the shoal marks the limit of the dredged channel.

(70) **Fawn Island, Ont.,** is off the Canadian side of the river about 3 miles above Port Lambton. Shoals with depths to 1 foot extend 0.4 mile SSW and NNE from the island. A buoy marks the S end of the shoals S of Fawn Island. A shoal with a least depth of 5 feet extends along the E limit of the dredged channel from about 0.3 to 1.3 miles N of Fawn Island with a deep channel between. An unmarked channel with a least depth of about 18 feet passes E of Fawn Island and the shoals. The channel is slightly winding and is not frequently used; the dredged channel W of Fawn Island is the preferred route.

(71) **Marine City, Mich.,** is on the W side of the river 7 miles above Russell Island. **Belle River** flows S through the town and empties into the St. Clair River NW of Fawn Island. A ferry operates between Marine City and Sombra, Ont.

(72) **Channels.**–In July 1993, the centerline controlling depths were 7 feet from the mouth of Belle River to the Bridge Street bridge, thence 4½ feet to the Broadway bridge. The channel is subject to shoaling.

(73) **Bridges.**–Bridge Street bridge, about 0.5 mile above the mouth of Belle River, has a 28-foot fixed W span with a clearance of 13 feet. Broadway bridge, about 1.1 miles above the river mouth, has a fixed span with a clearance of 7 feet. Several overhead cables in the lower 2 miles of the river have a least clearance of 37 feet.

(74) Marine City is a **customs station.**

(75) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(76) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(77) **Harbor regulations.**–A **slow-no wake speed** is enforced on the Belle River. The Marine City Chief of Police acts as harbormaster and enforces the regulations of St. Clair County and the State of Michigan. Copies of the regulations may be obtained from the chief of police.

(78) **Wharf.**–McLouth Yards, Inc. receives crushed limestone and coal at a wharf on the W side of the St. Clair River just below the mouth of Belle River. There is 1,200 feet of berthing space along the reinforced natural bank with a reported depth of 35 feet

alongside and a deck height of 5 to 8 feet. The facility has 12 acres of open storage.

(79) **Small-craft facilities.**–Marinas on the W side of the Belle River within 0.5 mile of the mouth provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 20-ton hoist can handle 42-foot vessels for hull, engine, and electronic repairs.

(80) **Ferry.**–A ferry operates year round, depending on ice conditions, from Marine City, about 0.6 mile NNE of the mouth of Belle River, across the St. Clair River to Sombra, Ont.

(81) **Sombra, Ont.,** is on the E side of the St. Clair River opposite Marine City, MI.

(82) The following is extracted (partial) from **Canadian Sailing Directions CEN304, Chapter 3, St. Clair River.**

(83) *Sombra (42°43′N., 82°29′W.), population 420 (1981), is on the east shore 0.6 mile NNE of Fawn Island.*

(84) *Sombra is a* ***Customs*** *land border reporting station for passengers, general public, and commercial highway traffic, and is a vessel reporting station for pleasure craft.*

(85) *A ferry serves Sombra and Marine City, Michigan, year round, depending on ice conditions. This is the* ***Blue Water Ferry.***

(86) ***Sombra Public wharf****, at the outer end of a causeway 230 feet (70.1 m) long and 20 feet (6.1 m) wide, is used by the Blue Water Ferry. The south face is 250 feet (76.2 m) long and is skirted by 23 pilings; berthing at this south wall is prohibited. The inner SE face, 82 feet (25 m) long, has 9 pilings with elevations of 12 feet (3.7 m) and depths of 4 feet (1.2m) in 1994. On the outer face, north of the ferry slip, there is a 50-foot (15.2 m) section of wharf with depths of 10 to 13 feet (3 to 4 m) in 1994, and a depth of 3 feet (0.9 m) along the north face of the wharf. There is a Canadian Coast Guard Emergency Response building with oil spill containment equipment on the south side of the wharf, and a* ***Customs office*** *on the north side.*

(87) *There are no facilities or shelter for small craft at Sombra Public wharf.*

(88) From a point 1.3 miles above Fawn Island, the channel through the St. Clair River is a natural deepwater channel 0.2 to 0.4 mile wide upstream for 6.5 miles to the lower end of St. Clair Middle Ground. The channel is marked by lighted buoys and lights.

(89) At **Stokes Point, Ont.,** (42°44.1′N., 82°28.7′W.), about 1.5 miles above Sombra, there is a ruined wharf. The wharf is marked by a light at its SW corner.

(90) Detroit Edison Co. has a powerplant with two wharves on the W side of the St. Clair River about 2 miles above Stokes Point. Several stacks at the plant are prominent, and private lights mark the upper and lower ends of the wharf area.

(91) **Wharf 1:** 500 feet below Dock Upper Light; about 400 feet of berthing space; 16 feet reported alongside; deck height, about 8½ feet; storage tanks for over 11 million gallons of #2 and #6 fuel oil; receipt of fuel oil and bunkering vessels.

(92) **Wharf 2:** adjacent N of Dock Lower Light; 1,069 feet of berthing space; 29 feet reported alongside; deck height, 8½ feet; open storage for over 2½ million tons of coal; two receiving hoppers, operating rates 2,400 and 10,000 tons per hour; receipt of coal and bunkering vessels.

(93) Overhead power cables with clearances of 154 and 163 feet cross the river just above and 1.8 miles above the Detroit Edison Co. wharves, respectively.

(94) **Ontario Hydro Lambton Generating Station,** is on the E side of the river about 2 miles above the Detroit Edison Co. wharves. The coal wharf, 1,000 feet (305 m) long, had a depth of 30 feet (9.1 m) in 1994.

(95) **St. Clair, Mich.,** is on the W side of the river about 7.5 miles above Marine City. **Pine River** is a stream 100 to 150 feet wide, emptying into the St. Clair River near the S limits of the city. The St. Clair Inn and Country Club 0.5 mile N of the mouth of Pine River is prominent.

(96) In August 1993, the centerline controlling depths in Pine River were 14 feet through the mouth to the Riverside Avenue bridge, thence 5½ feet to the upstream limit of the Federal project. The channel is subject to shoaling.

(97) **Bridges.**–Riverside Avenue (State Route 29) bascule bridge, just above the mouth of Pine River, has a clearance of 11 feet. (See **33 CFR 117.1 through 117.59 and 117.643**, chapter 2, for drawbridge regulations.) The Port Huron and Detroit Railroad bridge about 2 miles above the river mouth has a swing span with a clearance of 11 feet. Several overhead cables cross the river.

(98) A **slow-no wake speed** is enforced on the Pine River.

(99) **Wharf.**–Diamond Crystal Salt Co. receives salt and coal at a wharf on the W side of the St. Clair River just below the mouth of the Pine River. The wharf has 1,085 feet of berthing space with reported depths of 16 to 19 feet alongside and a deck height of 7½ feet. The wharf has 1.1 acres of open storage for 55,000 tons of coal and 7,500 tons of salt.

(100) **Small-craft facilities.**–The city of St. Clair and the Michigan State Waterways Commission have jointly developed docking and launching facilities on the Pine River immediately upstream of the M–29 Highway Bridge. Gasoline, diesel fuel, water, electricity, sewage pump-out facilities and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. In 1977, depths of 3 to 15 feet were reported available at the facility. Another facility on the W side of the river about 1.4 miles above the mouth provides gasoline, diesel fuel, water, ice, electricity, marine supplies, sewage pump-out, and a launching ramp. A 30-ton hoist is available for hull, engine, and electronic repairs.

(101) **St. Clair Middle Ground,** a shoal with a least depth of 1 foot, is in midriver from just below the mouth of Pine River N for about 1.5 miles to opposite Mooretown, Ont. Lighted buoys mark the shoal at its upper and lower ends and on the W side.

(102) From the lower end of St. Clair Middle Ground, the dredged channel of the St. Clair River leads W of the middle ground and upstream for about 12.5 miles to just above the mouth of the Black River, thence for about 1.5 miles through natural deep water to the head of the river at Lake Huron. This section of the river is marked by lighted and unlighted buoys and lights, and is maintained at the Federal project depth of 27 feet.

(103) Downbound vessels should exercise caution when negotiating the westerly turn at the upper end of St. Clair Middle Ground to avoid striking these shoals. The channel to the E of the middle ground, formerly for upbound channel, had a controlling depth of 24 feet in 1961, but is not being maintained.

(104) **Courtright, Ont.,** is a village on the E side of the river opposite St. Clair, MI. The **Public wharf**, is 180 feet (54.9 m) long, 10 feet (3 m) wide and 6 feet (1.8 m) high, and had a depth of 11 feet (3.4 m) in 1994. Courtright is a **Customs vessel reporting station** for pleasure craft.

(105) **Mooretown, Ont.,** is on the E side of the river 1.5 statute miles (1.3 nm) above Courtright. The wharf at Mooretown had a depth of 7 feet (2.1 m) in 1994 but had no facilities for boaters. A pile 52 feet (15.8 m) south of the SW corner of the wharf had an elevation of 3 feet (0.9 m) in 1994.

(106) **Stag Island** is off the Canadian side of the river about 3 miles above St. Clair Middle Ground. The main vessel channel is along the U.S. shore W of Stag Island. Shoals extend about 0.8 mile S and 0.6 mile N from the island and are marked at the outer

ends by lighted buoys. **Stag Island Shoal Light** is about midlength of the shoals off the S end of the island.

(107) A small-craft facility on the W side of the St. Clair River opposite the foot of Stag Island provides gasoline, water, and electricity.

(108) The Canadian channel E of Stag Island, formerly the upbound channel, had a controlling depth of 21 feet in 1950, but is no longer maintained. A **167°15′** lighted range marks the approach to Corunna, Ont., through the upper entrance to the channel and past the shoals off the mouth of **Talford Creek.**

(109) **Corunna, Ont.,** is a village on the Canadian channel E of Stag Island. A ferry operates from Corunna to the E side of Stag Island.

(110) **Wharf.**–Shell Canada, Ltd. operates a wharf on the E side of St. Clair River N of the mouth of Talford Creek. The wharf is 1,000 feet (305 m) long and 9 feet (2.7 m) high, with a depth of 23 feet (7 m) in 1994. Petroleum products are shipped and received, and bunkering is available. A tank farm here makes a good landmark.

(111) Detroit Edison Marysville Power Plant wharves are on the W side of the river about 2 miles above Stag Island.

(112) **Wharf 1:** (42°55′22″N., 82°27′37″W.); 340 feet of berthing space; 18 feet alongside; deck height, 9 feet; open storage for 167,000 tons of coal; receipt of coal.

(113) **Wharf 2:** 500 feet above Wharf 1; 400 feet of berthing space; 22 feet alongside; deck height, 9 feet; open storage for 53,000 tons of coal; receipt of coal.

(114) A buoy marks the S side of a 16-foot shoal on the E side of the St. Clair River oppsite Detroit Edison Marysville Power Plant Wharf 1.

(115) An overhead power cable with a clearance of 177 feet crosses the St. Clair River 1.9 miles above Stag Island.

(116) The upper part of the St. Clair River flows S between the cities of Port Huron, Mich., and Sarnia, Ont. The head of the river is entered from a dredged channel that leads through the shallow lower end of Lake Huron. A **180.3°** lighted range on the E side of the head of the river marks the approach to the river through this channel. A racon is at the front light. **Fort Gratiot Light** (43°00.4′N., 82°25.4′W.), 82 feet above the water, is shown from a white brick conical tower on the W side of the river head.

(117) **Blue Water Bridge,** a fixed highway bridge with a clearance of 155 feet at the center decreasing to 135 feet 300 feet from the center, crosses the river just below the head. The bridge is prominent in approaching the river. In September 1995, a replacement fixed highway bridge with a design clearance of 150 feet was under construction just south of the existing bridge.

(118) **Caution.**–Currents in the upper part of the river are considerable, at times 5 mph or more above the Blue Water Bridge and 4 mph or more for 1 mile below the bridge. Upbound vessels will experience a W set between the Blue Water Bridge and Lake Huron Cut Lighted Buoys 1 and 2. Mariners should use the lowest possible safe speed in this reach to avoid damage to wharves and moored vessels.

(119) A **207½°** lighted range on the W side of the river 0.5 mile below the Blue Water Bridge marks the channel through the head of the river to just below the bridge.

(120) **Bay Point** is a long narrow point that extends S along the E side of the river about 1.4 miles below the head. A lighted buoy marks submerged ruins off the S end of the point. A lighted buoy marks an 18-foot shoal off the W side of the inner end of the point.

(121) **Caution.**–An alternating one-way traffic zone is between Lake Huron Cut Lighted Buoy 1 and St. Clair/Black River Junction Light. (See **33 CFR 162.134 (c)(2),** chapter 2, for regulations.)

(122) **Anchorage.**–Good anchorage, clay and gravel bottom, is abreast of Sarnia below the section of the rapids near the Blue Water Bridge. Good holding ground and some eddy will be found near the Canadian shore below the Canadian National Railways Wharf. Vessels should anchor as close to shore as possible to leave the midchannel clear for passing vessels.

(123) A railroad tunnel crosses under the river about 1 mile below the mouth of the Black River. Two ferries cross the river between Port Huron and Sarnia, Ont., in the vicinity of the tunnel.

(124) **Port Huron, Mich.,** a city at the S end of Lake Huron, fronts the W side of the upper part of the St. Clair River. **Black River** flows SE through the city and empties into the St. Clair River 2.4 miles below its head.

(125) **Channels.**–A dredged channel leads from the mouth of Black River upstream to about 0.4 mile above the Grand Trunk Western Railroad bridge. In July 1989, the centerline controlling depths were 13 feet from the mouth to the 10th Street bridge, thence 10 feet to the railroad bridge, thence 4½ feet to the head of the project, thence 3½ feet to the I-94 bridge, thence 1 foot to the Black River Canal. The channel is subject to shoaling. St. Clair/Black River Junction Light marks the N side of the mouth of the river.

(126) **Fluctuations of Water Level.**–Each year spring freshets cause the level of the Black River to rise and fall from 4 to 6 feet. Day-to-day level changes due to wind can amount to several inches.

(127) Port Huron is a **customs port of entry.**

(128) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(129) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(130) **Coast Guard.**–Port Huron Coast Guard Station is on the W side of the head of the St. Clair River just S of Fort Gratiot Light.

(131) **Harbor Regulations.**–A **slow-no wake speed** is enforced on the following sections of Black River: from the mouth upstream to the Grand Trunk Western Railroad bridge, from 600 feet below to 800 feet above the I–94 bridge, and from 1,000 feet below to 500 feet above the intersection with the Black River Canal.

(132) **Towage.**–Tugs for Port Huron are available from Detroit. (See Towage under Detroit.)

(133) **Wharves.**–Port Huron has four deep-draft facilities. The alongside depths given are reported depths.

(134) **Port Huron Terminal Co. Wharf:** (42°57′32″N., 82°25′36″W.); 950-foot face; 25 to 29 feet alongside; deck height, 8 feet; 50,000 square feet covered storage; 100,000 square feet open storage; two 18-ton cranes; rail and water connections; receipt of general cargo, wood pulp, and beans; owned by city of Port Huron and operated by Port Huron Terminal Co.

(135) **Winkworth Transit Co. Wharf:** (42°58′17″N., 82°25′12″W.); about 1,500 feet of berthing space; 27 feet alongside; deck height, 8 feet; 50,000 square feet open storage; cranes to 60 tons; rail connections; receipt of crushed limestone and salt; owned and operated by Winkworth Transit Co.

(136) **Blue Water Aggregates Co. Wharf:** W side 0.9 mile below the head of St. Clair River; 1,100 feet of berthing space along natural bank; 28 feet alongside; deck height, 6 to 8 feet; open storage for 300,000 tons of stone; rail connections; receipt of

## Structures across Black River at Port Huron
### *Miles above the mouth of the river
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 1 | CSX RR bridge | Railroad | 0.09 | | | 100 | 6 | Bascule. Note 1. |
| 2 | Military St. bridge | Highway | 0.33 | | | 73 | 13 | Bascule. Note 1. |
| 3 | 7th St. bridge | Highway | 0.50 | | | 83 | 12 | Bascule. Note 1. |
| 4 | 10th St. bridge | Highway | 0.94 | | | 90 | 18 | Bascule. Note 1. |
| 5 | Grand Trunk Western RR bridge | Railroad | 1.56 | | | 80 | 14 | Bascule. Note 1. |
| 6 | Overhead cable | Power | 1.76 | | | | 63 | |
| 7 | Overhead cable | Telephone | 2.05 | | | | 40 | |
| 8 | I—94 bridge | Highway | 2.30 | | | 117 | 20 | Fixed. |
| 9 | Overhead cable | Telephone | 2.33 | | | | 40 | |
| 10 | Overhead cable | Power | 2.50 | | | | 46 | |
| 11 | Overhead cable | Power | 2.85 | | | | 64 | |
| | Junction with Black River Canal | | 4.34 | | | | | |
| 12 | Overhead cable | Power | 4.41 | | | | 41 | |

Note 1.—See **33 CFR 117.1 through 117.59 and 117.625,** chapter 2, for drawbridge regulations.

crushed stone; owned by city of Port Huron and operated by Blue Water Aggregates Co., Inc.

(137) **Port Huron-Sarnia Tunnel**, a railway tunnel, crosses under St. Clair River from Port Huron Terminal Co. Wharf E to the shores just W of the Imperial Oil Ltd. tank field at Sarnia, Ontario, Canada.

(138) **Small-craft facilities.**–The city of Port Huron and the Michigan State Waterways Commission have jointly developed small-craft facilities on the E side of the Black River just below the Military Street Bridge, on the E side of the river below 7th Street bridge, on the E side of the river between 7th and 10th Street bridges, and on the W side of the river below the I–94 bridge. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. Other marinas in Black River additionally provide launching ramps and lifts to 60 tons for hull, engine, and electronic repairs.

(139) **Supplies.**–Water and some marine supplies and provisions are available at Port Huron Terminal Co. Wharf. Bunker C and diesel fuel are available at oil company terminals at Sarnia.

(140) **Communications.**–Port Huron has good highway and rail connections. St. Clair County Airport is 5 miles S of the city.

(141) **Sarnia, Ont.,** is a city near the head of the St. Clair River on the E side opposite Port Huron. The following is extracted (partial) from **Canadian Sailing Directions CEN304, Chapter 3, St. Clair River.**

(142) **Sarnia Harbour** *(42°59′N., 82°24′W.) is on the east shore near the head of St. Clair River. Sarnia is a major importing and exporting centre; petroleum products, rubber, chemicals, beans, sand, tobacco, grain and fertilizer are exported, and grain, steel, lumber, coal, crude oil, crushed stone and cement are imported. All types of marine supplies and facilities are available, including bunker and diesel fuel. Major marine repairs can be carried out. The navigation season is from mid-March to the end of December.*

(143) *The city of* ***Sarnia, Ont.*** *with a population of 74,376 (1991), is a petroleum refining and chemical producing area. Open farmland lies east and south of the city. Sarnia Airport offers scheduled passenger services. Sarnia is served by the Canadian National Railway and CSX Transportation. Good highways connect Sarnia with other major cities.*

(144) *Sarnia is a* ***Customs land border reporting station*** *for passengers, general public, and commercial highway traffic, a vessel clearing station for commercial vessels, and a vessel reporting station for pleasure craft.*

(145) *Immigration and agricultural inspection facilities are also available at Sarnia.*

(146) *Sarnia Harbour is a Public harbour administered by Transport Canada. The harbour limits include the Canadian waters of St. Clair River from Point Edward to below Southeast Bend.*

(147) *(Sarnia Harbour wharves are listed in the table.)*

(148) **Point Edward, Ont.,** is a village on the E side of the head of the St. Clair River.

**Sarnia Harbour-Major Facilities**

| Name | Wharf length ft (m) | Depth † ft (m) | Elevation †† ft (m) | Remarks |
|---|---|---|---|---|
| | | | | **Note: All information in this table was provided by local authorities. User should consult local authorities for latest conditions.** |
| Shell Canada, Ltd | 2,000 (610) | 24 (7.3) | 11.5 (3.5) | Bulk loading and discharging of petroleum products, and bunkering. |
| Sun Oil Co. Ltd | 1,000 (305) | 22 (6.7) | 8 (2.4) | Bulk loading of tankers. |
| Dow Chemical Co. | 600 (183) | 25 (7.6) | 18 (5.5) | Loading bulk liquid products. |
| Polymer Corporation | 600 (183) | 24 (7.3) | 10 (3) | General plant supplies and loading of bulk liquid products. |
| Mueller Brass Works | 218 (66) | 18 (5.5) | | Mooring posts. |
| Imperial Oil Ltd. | | | | All Imperial Oil wharves are fitted with manifolds for handling bulk products. The wharves have the usual facilities: lights, steam and fresh water. |
| - Lower dock | 720 (219) | 22 (6.7) | 8.5 (2.5) | This dock can accommodate a ship 600 feet (183 m) long. |
| - Dock | 283 (86) | 25 (7.6) | 8.5 (2.5) | |
| - No. 1 Crude | 610 (186) | 25 (7.6) | 8.5 (2.5) | |
| - Cement dock | 326 (99) | 25 (7.6) | 8.5 (2.5) | Lafarge Cement. |
| - Upper dock | 592 (180) | 22 (6.7) | 8.5 (2.5) | A concrete wharf that joins Upper dock and No. 1 Crude dock can accommodate a ship 1,000 feet (305 m) long. |
| Belton Lumber Co | 1,000 (305)* | 18 (5.5) | | Mooring posts. *Berthing length. |
| Reid Aggregates Ltd. | 440 (134) | 23 (7) | 6 (1.8) | Bulk stone storage. |
| Public Wharf | 1,040 (317) | 24 (7.3) | 6 (1.8) | Electricity and fresh water available. Shed 300 x 40 feet (91 x 12 m). Shed 160 x 40 feet (49 x 12 m). Three sheds 140 x 40 feet (43 x 12 m). |
| Sarnia Elevator | 900 (274) | 22 (6.7) | 5 (1.5) | Railway lines to wharf. Electrical power and fresh water available. Shed 475 x 100 ft (145 x 30 m). |
| Transport Canada North Slip-East Side | 1,700 (518) | 24 (7.3) | | Mooring dolphins. |
| Holmes Foundry Co. | 262 (80) | 20 (6.1) | 7 (2.1) | Grounded ship used as a wharf. Self-unloaders dischar sand. |
| Canadian National Railways water | 1,100 (335) | 18 (5.5) | 10 (3) | Formerly Canada Steamship Lines wharf. Railway lines on wharf. Fresh and electrical power available. Shed 750 x 100 feet (229 x 30 m). |

† Depth below chart datum. †† Elevation above chart datum.

# 10. LAKE HURON

(1) **Chart Datum, Lake Huron.**–Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Huron is on elevation 577.5 feet (176.0 meters) above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

**Dimensions, etc.**

(2) Length, steamer track, De Tour Passage to Fort Gratiot; 223 miles.

(3) Length, steamer track, Straits of Mackinac to Fort Gratiot; 247 miles.

(4) Length (right line), Drummond Island, at nearest point to entrance of False Detour, to Blue Point; 206 miles.

(5) Breadth (right line), on about latitude 44°30′N.; 183 miles.

(6) Depth, maximum recorded by NOS; 750 feet.

(7) Water surface of lake (including St. Marys River below Brush Point, North Channel, and Georgian Bay); 9,100 square miles (U.S.), 13,900 square miles (Canada).

(8) Entire drainage basin (including St. Marys River below Brush Point, North Channel, and Georgian Bay); 25,300 square miles (U.S.), 49,400 square miles (Canada).

(9) **General description.–Lake Huron** is the second largest of the Great Lakes. Three large bays extend from the main body of the lake, Saginaw Bay on the W side and North Channel and Georgian Bay on the NE side. The lake receives the waters of Lake Michigan through the Straits of Mackinac and those of Lake Superior from the St. Marys River. The lake discharges at its S end into St. Clair River at Fort Gratiot. The lake is a connecting link in the Great Lakes chain. The depth of water in St. Marys River, St. Clair River, and Detroit River governs the draft of vessels navigating Lake Huron to and from Lakes Superior and Erie.

(10) **Vessel Traffic Service.**–The Canadian Coast Guard operates a Vessel Traffic Service in Canadian waters from Long Point in Lake Erie through the Detroit and St. Clair Rivers to De Tour Reef Light in Lake Huron. (See chapter 3 and the Annual Edition of Canadian Notices to Mariners for complete information.)

(11) **Fluctuations of water level.**–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, the lowest stages prevailing during the winter and the highest during the summer.

(12) In addition to the normal seasonal fluctuations, oscillations of irregular amount and duration are also produced by storms. Winds and barometric pressure changes that accompany squalls can produce fluctuations that last from a few minutes to a few hours. At other times, strong winds of sustained speed and direction can produce fluctuations that last a few hours or a day. These winds drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This effect is more pronounced in bays and at the extremities of the lake, where the impelled water is concentrated in a small space by converging shores, especially if coupled with a gradually sloping inshore bottom which even further reduces the flow of the lower return currents. This condition is very pronounced at the mouth of Saginaw River.

(13) **Weather, Lake Huron.**–Gales are most frequent in autumn. By late summer there is a noticeable increase, lakewide, in the frequency of gales, and this increase continues until the end of the navigation season. During November and December, gales are blowing 5 to 10 percent of the time, while windspeeds of 28 knots or more may be encountered up to 23 percent of the time. These winds are mainly generated by winter storms; their frequency falls dramatically in spring. By June and July, gales are expected less than 1 percent of the time, while winds of 28 knots or more blow less than 3 percent of the time. However, squall lines and thunderstorms can produce violent short-period winds from spring through fall. For example, the strongest measured wind on Lake Huron's open waters occurred in August 1965 and was measured at 95 knots from WNW. Shoreline extremes range from 43 to 53 knots. Directions of these extremes are often out of the SW; but W, NW, and NE winds have set some of these records. Most of the records were set from late fall through late winter.

(14) The shape of Lake Huron is such that strong winds from any quarter may generate rough seas somewhere on the lake. S through W winds are common in early autumn, while westerlies and southwesterlies prevail in late autumn. W through NW winds are often the strongest. Winds from a northerly quadrant can raise dangerous seas in the S, especially near the S outlet of the lake. In the central waters a long fetch of strong easterlies or northeasterlies can generate high seas along the Michigan shore, which run athwart the N-S traffic through the lake. Southerlies can be dangerous particularly near the converging N shore. If the fetch and duration are sufficient, waves of 10 feet or more can be generated in open waters by winds from any direction once they reach 20 knots or more. This occurs most often during October, November, and December, when waves of 10 feet (3 m) or more can be expected 2 to 4 percent of the time in the NW and S parts of the lake and 4 to 7 percent in the wide central portion. Extreme waves of 20 to 22 feet (6 to 7 m) have been encountered throughout the lake.

(15) Dense fog plagues the mariner most often in spring and early summer over the open lake waters. From April into July visibilities drop below 0.5 mile up to 11 percent of the time. May and June are the worst times, and the cold, central waters are the most likely place. These fogs are usually the result of warm air moving across the lake that is still cold from the previous winter season. They often come on winds with a southerly component; but NW, NE, and E winds also bring them. Fog is most prevalent and thickest during the morning hours. Rain, blowing snow and low clouds also reduce visibilities, particularly from late fall through early spring.

(16) Thunderstorms are most frequent from April through October, with peak activity during June, July, and August. Over the open water during this peak season thunderstorms are encountered 2 percent of the time. They are most likely between midnight and sunrise. Onshore thunderstorms can be expected on 4 to 7 days per month in the summer months. They are most likely during the late afternoon.

(17) **Ice.**–The central part of Lake Huron is mainly an open water area, but drifting patches of thin ice may be present from

early February until mid-March. These patches drift S toward the St. Clair River. An ice bridge forms across the head of the river. Ice accumulates to a depth of 12 to 18 inches above the ice bridge; the bridge itself achieves a much greater thickness. The ice bridge is occasionally broken by high winds.

(18) In North Channel, fast ice forms in mid-January and reaches a thickness of 25 to 30 inches by mid-March, then decays rapidly and clears by mid-April. In Georgian Bay, ice begins to form near the end of December, and fast ice is well established by early January. The cover spreads over the entire bay by the end of January, but although concentrations are high, the ice is moved around by the wind to form leads and dispersed ice areas. This ice usually reaches the thick category during the first half of March. Decay begins in mid-March; the ice melts within the bay, and the area is clear by mid-April. Rotting fast ice may be present in some areas until the end of April.

(19) The Straits of Mackinac is subject to severe problem ice conditions. The area is very susceptible to wind action, and the ice cover is unpredictable. Ice forms early in the season in the Straits and attains an average thickness of 17 inches and an average maximum thickness of 25 inches. The solid ice thickness remains about the same throughout the season. The prevailing W winds cause considerable ridging and 4– to 6–foot windrows are common. Some ice ridges as much as 30 feet deep have been reported.

(20) Ice normally begins to form in harbors and shallow-water areas in early December with ice fields and concentrated brash forming in early January. The first ice barrier across the Straits usually forms between Waugoshance Point and St. Helena Island.

(21) As ice forms in South Channel and between St. Ignace and Mackinac Island, these waters are closed to navigation to allow the formation of ice bridges. Mariners are notified of the closure by Broadcast Notice to Mariners.

(22) Prevailing W winds cause ice conditions at the Lake Michigan end of the Straits of Mackinac to be more difficult than at the Lake Huron end. From the Mackinac Bridge to Lansing Shoals, the Straits are normally frozen over with solid plate ice by mid-January. Heavy accumulations and ridging occur in the vicinity of St. Helena Island, White Shoal, and the reefs along the Upper Peninsula of Michigan. To avoid danger to vessels, Grays Reef Passage may be closed to navigation; mariners will be informed of any closure by Broadcast Notice to Mariners.

(23) As deterioration begins in March or April, stable fast ice becomes drift ice moving with winds and currents. Tracks cut by icebreakers become unreliable as the ice field deteriorates and shifts. Thick shore ice may drift into otherwise open channels and endanger even ice-reinforced vessels. A vessel which becomes beset in drift ice is vulnerable to grounding because of the many shoals, reefs and shallow-water areas in the Straits of Mackinac.

(24) Wind-driven currents in the western Straits run eastward. Vessels beset in ice southeast of St. Helena Island have become endangered by drifting toward McGulpin Point or the Mackinac Bridge pilings.

(25) The brash and drift ice between Mackinaw City, St. Ignace and Round Island remains east of the Mackinac Bridge, trapped by the ice in South Channel. The NNW winds will flush this ice out into Lake Huron when the ice in South Channel begins to break up.

(26) Coast Guard icebreakers assigned to the Straits of Mackinac are based in St. Ignace and Cheboygan. Their services can be requested through Commander, Coast Guard Group Sault Ste. Marie; VHF-FM channel 16. (See Winter Navigation, chapter 3.)

(27) **Routes.**–The Lake Carriers' Association and theCanadian Shipowners Association have recommended, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Huron:

(28) Downbound vessels shall lay a course from De Tour Passage of **137°** for 56 miles to pass not less than 15 miles **045°** from **Middle Island Light**, then a course of **161°** for 105 miles to not less than 12 miles **067°** from **Harbor Beach Light**; then a course of **180°** for 57 miles to the entrance to Lake Huron Cut.

(29) Downbound vessels from the Straits of Mackinac shall lay a course of **070°** for 6 miles from a point S of Poe Reef; then a course of **115°** for 61 miles to join the regular downbound course from De Tour Passage at a point not less than 15 miles **045°** from Middle Island Light.

(30) Downbound vessels from Calcite from a point abreast of Adams Point (45°24.9′N., 83°43.0′W.) shall lay a course of **100°** for 30 miles to intersect the regular downbound course from De Tour Passage at a point not less than 15 miles **045°** from Middle Island Light.

(31) Downbound vessels from Stoneport Harbor shall lay a course of **098°** for 18 miles to intersect the regular downbound course from De Tour Passage at a point 14 miles **071°** from Middle Island Light.

(32) Downbound vessels from Alpena shall steer **159°** for 58 miles on Harbor Beach Light to a point 12 miles **353°** from **Pointe aux Barques Light**; then a course of **134°** for 28 miles to intersect the regular downbound course from De Tour Passage at a point 12 miles **067°** from Harbor Beach Light.

(33) Downbound vessels from De Tour Passage to Cove Island from a position abreast of **De Tour Reef Light** shall lay a course of **137°** for 12 miles; then **123°** for 37 miles to a position 10 miles **213°** from **Great Duck Island Light**, then **103°** for 61.25 miles to a position with Cove Island Lighted Bell Buoy T abeam.

(34) Downbound vessels from Cove Island to Lake Huron Cut from a position abreast of Cove Island Lighted Bell Buoy T shall lay a course of **225°** for 7 miles; then **189°** for 157 miles to Lake Huron Cut.

(35) Eastbound vessels from the Straits to northern ports on the W side of Lake Huron shall take departure from 0.5 mile NNE of **Cordwood Point Lighted Buoy 1** and steer not less than **117°** for 47 miles to a point 2.5 miles off Presque Isle Light; then steer **138°** for 23.4 miles to a point on the upbound recommended course off Nordmeer Wreck Lighted Bell Buoy WR1.

(36) Southbound vessels bound for Alpena from **Nordmeer Wreck Lighted Bell Buoy WR1** shall steer **189°** for about 7.25 miles to a point 1.5 miles abeam of Thunder Bay Island Light; then steer **227°** on Thunder Bay Traffic Buoy for 5.5 miles; then to destination.

(37) Southbound vessels bound for Saginaw from Nordmeer Wreck Lighted Bell Buoy WR1 shall steer **181°** for 29.5 miles to a point 6 miles E of Sturgeon Pt. Light; then steer **189°** for 27.75 miles to a point 3 miles E of **Au Sable Point Lighted Buoy 1**; then steer **224°** for 19.25 miles to Charity Island Lighted Bell Buoy 5; then to destination.

(38) Upbound vessels shall lay a course of **353°** for 54 miles to pass not more than 5 miles **067°** from Harbor Beach Light; then steer **341°** for 99 miles to pass not over 7 miles **071°** off Middle Island Light; then a course of **325°** for 60 miles to De Tour Passage.

(39) Upbound vessels for the Straits of Mackinac shall lay a course of **318°** for 16.5 miles from off Middle Island Light to a point 5 miles **050°** from Presque Isle Light; then steer a course of **295°** for 47 miles to abreast of Cordwood Point Lighted Buoy 1; then steer a course of **270°** for 3 miles to a point off **Poe Reef Light.**

(40) Eastbound vessels from Round Island Passage shall lay a course of **090°** for 22 miles to a point 4.75 miles off Martin Reef Light; then steer a course of **061°** for 14 miles to point 0.75 miles **128°** from De Tour Reef Light.

(41) Upbound vessels from Lake Huron Cut to Cove Island shall steer a course of **037°** for 15 miles; then steer a course of **008°** for 143.5 miles to Cove Island Lighted Bell Buoy T.

(42) **Caution.**-A wreck covered 29 feet is W of the trackline about 10.5 miles **018°** from Fort Gratiot Light in about 43°09.2′N., 82°21.5′W.

(43) Upbound vessels from Cove Island to De Tour Passage from a position abreast of **O'Brien Patch Lighted Bell Buoy TC** shall lay a course of **284°** for 61.5 miles to a position 6 miles **194°** from Great Duck Island Light; then steer **300°** for 48 miles to a position 3 miles **137°** from De Tour Light; then steer **317°** for 3 miles to a point 0.75 miles **128°** from De Tour Reef Light.

(44) It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on chart 14860, Lake Huron.

(45) It is recommended that the following limit of anchorage be observed in Lake Huron off De Tour Light so that vessels may enter or leave De Tour Passage in time of congestion due to fog or other conditions: No vessel to anchor E of a bearing on De Tour Light of **340°**, or closer than 0.75 mile to the light or N of the De Tour Martin Reef course.

(46) **Pilotage.**–The waters of Lake Huron in the approach to St. Clair River S of 43°05′30″N. are Great Lakes designated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. The remaining waters of Lake Huron are Great Lakes undesignated waters; the above vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters. Registered pilots for St. Clair River are supplied by Lakes Pilots Association, and for Lake Huron by Western Great Lakes Pilots Association (See appendix for addresses.) Pilot exchange points are off Port Huron at the head of St. Clair River in about 43°05′30″N., 82°24′42″W. and at De Tour, Mich., at the entrance to St. Marys River. Three pilot boats are at Port Huron; HURON BELLE has an international orange hull with an aluminum cabin, and HURON MAID and HURON LADY each have an international orange hull with a white cabin. The pilot boat at De Tour, LINDA JEAN, has a green hull and a white cabin. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

(47) **Principal ports.**–The principal ports on Lake Huron are Bay City and Saginaw in the Saginaw River and Cheboygan. Private docks for deep-draft vessels are also at Alabaster, Port Gypsum, Alpena, Rockport, Stoneport, Calcite, and Port Dolomite.

(48) **Charts 14862, 14865.**–The S end of Lake Huron in the approach to the head of the St. Clair River is obstructed by an extensive shoal area. A dredged channel, maintained at the Federal project depth of 30 feet, leads S for about 6 miles through the shoals to the head of the river. The channel is marked by lighted buoys and a **180.3°** lighted range at Point Edward, Ont. A racon is at the front light. Lake Huron Cut Lighted Buoy 12 marks the entrance to the channel from Lake Huron. Lake Huron Cut Light 7, about 2.2 miles from the entrance, is equipped with a racon.

(49) **Fort Gratiot Light** (43°00.4′N., 82°25.4′W.), 82 feet above the water, is shown from a white brick conical tower on the W side of the head of St. Clair River. Port Huron Coast Guard Station is close S of the light.

(50) Dredging spoils are adjacent to both sides of the dredged channel. On the E side of the channel, the spoil bank extends about 4 miles N from Point Edward and is about 1 mile wide with depths of 6 to 12 feet. A wreck, covered 15 feet, is E of the channel 3.4 miles NE of Fort Gratiot Light. On the W side of the channel, the spoil bank has depths of 9 to 15 feet for 4.5 miles N of Fort Gratiot Light, thence 16 to 24 feet for another 1.5 miles N.

(51) **Black River Canal,** entered about 1.4 miles NNW of Fort Gratiot Light, extends SW for about 1.1 miles to its junction with the Black River.

(52) From the head of the St. Clair River NNW for 19 miles to Lexington, the shore is low. In this stretch, the lake bottom is generally rocky with depths to 18 feet extending 1.3 miles offshore. A shoal with a least depth of 12 feet is 0.9 mile NE of the mouth of **Burtch Creek,** 7 miles S of Lexington. A 16-foot diameter potable water intake extends from shore 5.7 miles NNW of Fort Gratiot Light NE for 5 miles to a crib covered 40 feet. A wreck, covered 29 feet, is 10.7 miles NNE of Fort Gratiot Light.

(53) **Chart 14862.–Lexington, Mich.,** is an artificial harbor 19 miles NNW of the head of St. Clair River. An elevated white water tank in Lexington is prominent from lakeward.

(54) **Channels.**–A dredged entrance channel leads N from deep water in Lake Huron to a harbor basin formed by two breakwaters. The harbor entrance is marked by buoys and by lights on the outer ends of the breakwaters. In September 1997, the controlling depth was 5½ feet (7½ feet at midchannel) in the entrance channel, thence depths of 6½ to 8 feet were available in the anchorage basin.

(55) A wreck, covered 13 feet, is 0.6 mile ESE of the harbor entrance.

(56) **Small-craft facilities.**–A marina developed by the Michigan State Waterways Commission is in the harbor basin. Transient berths, gasoline, diesel fuel, electricity, water, launching ramps, sewage pump-out facilities, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9.

(57) The shore from Lexington N for 11 miles to Port Sanilac consists of low bluffs. The 18-foot contour is about 0.6 mile offshore, and there are numerous submerged rocks as much as 0.5 mile offshore in this stretch. The most dangerous is a group of rocks that uncover during low water conditions about 5 miles N of Lexington.

(58) **Port Sanilac, Mich.,** an artificial harbor used by pleasure craft, is on the W shore of Lake Huron about 30 miles N of the head of St. Clair River. An elevated blue tank just N of the harbor is prominent from lakeward.

(59) **Port Sanilac Light** (43°25.8′N., 82°32.4′W.), 69 feet above the water, is shown from a white octagonal tower in the village, SW of the harbor basin.

(60) **Channels.**–A dredged entrance channel extends N from deep water in Lake Huron on the W side of an extension of the N breakwater which protects the harbor entrance. The channel turns W between the N breakwater and a detached S breakwater into the harbor basin. The outer ends of the breakwaters are marked by lights. In September 1997, the controlling depths were 8½ feet (10 feet at midchannel) in the entrance channel, thence depths of 9 to 10 feet in the N section of the basin, thence 2 to 6 feet in the S section of the basin.

(61) **Small-craft facilities.**–A marina developed by the Michigan State Waterways Commission is on the W side of the harbor basin. A private marina is in the basin. Transient berths, gasoline, diesel fuel, water, electricity, haul-out facilities, sewage pumpout, launch ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. The private marina

also provides a 20-ton hoist, and hull, engine, and electronic repairs.

(62) The private marina also provides a launching ramp, a 20-ton hoist, and hull, engine, and electronic repairs.

(63) From Port Sanilac the shore continues bluff and rocky for 29 miles N to Harbor Beach. The 18-foot contour is no more than 1 mile offshore, but numerous rocks, bare and submerged, present a hazard to small craft navigating this stretch. The most dangerous are a rock that bares about 0.3 mile offshore 1 mile N of Port Sanilac and a group of rocks, covered 3 to 6 feet, 0.5 mile offshore 11.5 miles N of Port Sanilac.

(64) **Forester, Mich.,** 5 miles N of Port Sanilac, can be identified by two church spires close to shore. There are no docks; shoals, rocks, and dock ruins render navigation hazardous. Landing should not be attempted without local knowledge.

(65) **Forestville, Mich.,** about 16 miles N of Port Sanilac, can be identified by the spire of a small white church. A rock jetty with a launching ramp on its N side extends about 200 feet from shore at the village. There is excellent holding ground SE of the jetty in 30 feet.

(66) From Forestville N to Harbor Beach numerous submerged rocks extend as much as 0.7 mile offshore.

(67) **Harbor Beach, Mich.,** is an artificial harbor about 60 miles N of the head of the St. Clair River. It is an important harbor of refuge for large vessels on the W shore of Lake Huron. A 300-foot stack at the powerplant in the N part of the harbor is prominent.

(68) **Harbor Beach Light** (43°50.7′N., 82°37.9′W.), 54 feet above the water, is shown from a white conical tower on the N side of the harbor entrance. A fog signal is at the light.

(69) **Channels.**–A dredged entrance channel leads W from deep water in Lake Huron between detached breakwaters to a dredged anchorage basin inside the N breakwater. Lights mark the ends of the breakwaters at the harbor entrance, and buoys mark the channel inside the harbor. In July 1998, the controlling depths were 21 feet in the entrance channel, thence 17 to 19 feet in the buoyed section of the basin; thence in July 1997, depths of 4 to 19 feet were available in the remainder of the basin except for lesser depths in the NE corner and along the NE side of the basin.

(70) Small craft can enter the harbor through a gap in the N breakwater. In 1966, the controlling depth in the gap was 7 feet in the E half and 5 feet in the W half. Small craft with local knowledge can enter the harbor at the S end; a depth of about 3 feet can be carried, taking care to avoid shoals and a wreck covered 1 foot off the S end of the S breakwater.

(71) **Dangers.**–Two wrecks in the harbor, covered 6 feet and 3 feet, are about 0.6 mile WNW and WSW of Harbor Beach Light, respectively.

(72) **Harbor Beach Coast Guard Station,** seasonal, is just N of Harbor Beach at Waterworks Park.

(73) **Harbor Regulations.**–(See **33 CFR 207.480,** chapter 2, for harbor regulations.)

(74) **Wharves.**–The Detroit Edison Co. Harbor Beach Power Plant Wharf is on the W side of the harbor about 0.7 mile NW of Harbor Beach Light. The wharf has 700 feet of berthing space with dolphins, and reported depths of 15 feet alongside. There is storage for 150,000 tons of coal.

(75) No services, other than dockage along the breakwater, are available to large vessels in Harbor Beach.

(76) **Small-craft facilities.**–An 850-foot public dock WSW of the harbor entrance is in reasonably good condition and has a launching ramp on its N side. A Michigan State Waterways Commission marina is at the N end of the harbor. In 1985, the controlling depth was 2 feet in the entrance, thence 2 feet in the basin with 1½ feet along the N edge. A private marina is located just S of the Detroit Edison power plant. In 1977, the reported controlling depth was 7 feet in the approach channel with 2½ feet along the docks. The channel is marked by private buoys. Gasoline, diesel fuel, water, electricity, launch ramps, pump-out facilities, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. The private marina also has marine supplies and outboard motor repairs.

(77) There is a hospital in Harbor Beach.

(78) From Harbor Beach NNW for 15 miles to Pointe aux Barques Light, the shore is low and wooded with bluffs from close up to 1 mile from shore. An extensive flat with rock ledges and detached bare and submerged rocks extends as much as 1.5 miles offshore. Off **Forest Bay,** from 2 to 3 miles N of Harbor Beach, several dangerous ledges with depths of 2 to 10 feet extend N and S, 1 to 1.5 miles offshore.

(79) **Port Hope, Mich.,** a small village about 7 miles N of Harbor Beach, has a dock in very poor condition and a small basin formed by breakwalls. The approach and the basin have less than 2 feet of water. A marina, with 1 foot reported alongside in 1977, is just S of the basin and provides water. Port Hope Chimney, a freestanding stone and brick stack on the beach, is a State monument. This stack and the spire in the village are prominent. Good holding ground is found E and N of Port Hope, in depths of 35 to 40 feet.

(80) **Pointe aux Barques Light** (44°01.4′N., 82°47.6′W.), 93 feet above the water, is shown from a white conical tower with an attached dwelling on a point 15 miles NNW of Harbor Beach.

(81) A dangerous reef, with rocks covered less than 6 feet near its outer edge, extends 2 miles E from Pointe aux Barques Light. A 5-foot spot is 1.2 miles NE of the light, and boulders, covered 13 to 15 feet, extend up to 2.5 miles N and NE from the light. A lighted buoy marks the extent of the reefs NE of the light.

(82) **Chart 14863.**–From Pointe aux Barques Light to **Pointe aux Barques** (44°04.1′N., 82°57.9′W.), 9 miles NW, the shore continues low and wooded. Ledges and detached rocky spots render the stretch dangerous within 3 miles of shore. **Orion Rock,** covered 3 feet, is about 0.8 mile offshore 3 miles NW of Pointe aux Barques Light.

(83) **Grindstone City, Mich.,** a small settlement 5.5 miles NW of Pointe aux Barques Light, has a small-craft harbor formed by two jetties. A privately dredged channel, marked by private buoys, leads along the NW side of the SE jetty, thence angles W between projections on the inner sides of the jetties to a harbor basin. In 1977, the reported controlling depth was 4 feet in the approach, entrance channel, and basin. However, it was reported that sudden atmospheric pressure or wind changes may change the water level in the harbor by as much as 1 foot. The harbor should not be entered without local knowledge. Gasoline is available in the harbor.

(84) In June 1983, a sunken wreck was reported about 1.2 miles E of the harbor in about 44°03′24″N., 82°51′50″W.

(85) At **Burnt Cabin Point,** 2 miles E of Pointe aux Barques, a rocky ledge extends off about 0.8 mile around the point. **Alaska Bay,** a small bight between Burnt Cabin Point and Pointe aux Barques, has good water to within about 0.4 mile of its head. **Port Austin Reef** is a dangerous reef extending 1.7 miles NW from Pointe aux Barques. **Port Austin Reef Light** is near the outer edge of the reef. The light should not be passed close aboard even by vessels of shallow draft because of riprap and other obstructions that extend out 900 feet from the base. A detached 11-foot

shoal, marked on the N side by a buoy, is 0.9 mile NNW of the light. Vessels should not pass inside the buoy.

(86) From Pointe aux Barques the shore extends SW to Port Austin with rocky flats extending about 0.5 mile offshore.

(87) **Port Austin, Mich.,** is a village and small-craft harbor at the mouth of **Bird Creek** about 2 miles SW of Pointe aux Barques on the shore of a shallow bay between that point and **Flat Rock Point** (44°02.7′N., 83°01.6′W.). A church spire just E of town and a radio mast on high ground 1.5 miles S of the harbor are prominent.

(88) **Channels.**–A dredged entrance channel leads S from deep water in Lake Huron to a harbor basin protected by a breakwater on the W and NW sides. The outer end of the breakwater is marked by a light. In September 1997, the controlling depths were 11 feet in the entrance channel except for shoaling to 10 feet along the edge of the channel about 75 feet NNW of the end of the W breakwater, thence depths of 10 feet were in the N 400 feet of the basin and 2½ to 7 feet in the remainder of the basin except for shoaling to ½ foot in the S end. Depths of 5½ feet could be carried to the W pier at the mouth of Bird Creek by favoring the NW and W edges of the basin.

(89) The entrance should be approached from the N or NW to avoid the reef area NE of the harbor. A buoy 0.4 mile N of the breakwater light marks the NW extent of the reef. Buoys mark the E and SE limits of the dredged basin. The harbor affords limited protection from all winds.

(90) Bird Creek enters the harbor at the S end of the basin. The W side of the mouth of the creek is protected by a pier that extends about 450 feet N. The creek is entered by holding close to the pier, because of shoaling on the E side of the mouth. In 1979, the W side of the mouth was reported dredged to 4 feet. In 1977, it was reported that local interests had dredged the creek to 6 feet for about 0.2 mile above the mouth.

(91) W of the creek mouth, the Michigan State Waterways Commission has dredged a basin and provided docking facilities for small craft. The basin has been dredged to 6 feet, mostly from solid rock, leaving a hazardous abrupt shoal border along its limits. The W and S limits of the basin are marked by private buoys.

(92) **Small-craft facilities.**–A marina developed by the Michigan State Waterways Commission is in the harbor basin. Transient berths, gasoline, water, electricity, launch ramp, sewage pump-out, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. Marinas in Bird Creek also provide diesel fuel and marine supplies. A 15-ton hoist can handle 43-foot vessels for hull, engine, and electrical repairs.

(93) **Saginaw Bay,** the largest indentation on the W side of Lake Huron, is 26 miles wide at its entrance between Pointe aux Barques to SE and **Au Sable Point** (44°20.0′N., 83°20.4′W.) to NW. The bay extends about 52 miles SW to its head at the mouth of the Saginaw River. At about its midpoint, the bay is constricted to a width of about 13 miles between Sand Point (43°54.8′N., 83°24.0′W.) to SE and Point Lookout (44°03.0′N., 83°34.8′W.) to NW.

(94) The mouth of the bay is wide and open with good depths, but the deepwater channel leading to the upper part of the bay is restricted to a width of about 1.8 miles between a shoal that extends SE from Point Lookout and a very shallow bank that extends as much as 14 miles from the E shore of the bay. S of Point Lookout, the bay widens to as much as 22 miles. A deepwater channel up to 7 miles wide, with depths of 24 feet or more, extends to within 8 miles of the head of the bay. A dredged channel extends through the shallower water at the head of the bay to the mouth of the Saginaw River.

(95) **Fluctuations of water level.**–The water level in Saginaw Bay is subject to sudden changes due to the wind. A NE gale driving water into the bay can raise the level at the mouth of Saginaw River 3 to 4 feet, sometimes in less than as many hours, while a SW wind sometimes lowers the level sufficiently to cause large vessels to ground in the channel.

(96) **Caution.**–The course across the mouth of Saginaw Bay is dangerous in heavy weather. Tawas Bay, on the W side of the mouth, has good anchorage with protection from all but SW winds.

(97) Numerous charted and uncharted fish net stakes and structures, some submerged, are in Saginaw Bay.

(98) From Port Austin, the E shore of Saginaw Bay trends generally SW for 22 miles to **Sand Point.** From **Flat Rock Point,** 1.5 miles W of Port Austin, the shore consists of low bluffs for 3 miles SSW to the mouth of **Pinnebog River,** thence 3 miles W to **Hat Point.** The bluffs become wooded from Hat Point W for about 8 miles to **Oak Point** (43°58.5′N., 83°15.7′W.). At Oak Point the shore turns SW for 2 miles to Caseville Harbor, thence SW and W for 7 miles to the extremity of Sand Point.

(99) Between Flat Rock Point and Oak Point, shoals extend as much as 5 miles N from the shoreline. **Flat Rock Point Reef,** with a least depth of 2 feet, is W of Flat Rock Point with its S end about 1.7 miles NW of the mouth of Pinnebog River and thence extending 1 mile N. **Hat Point Reef,** with a least depth of 2 feet near its outer end, extends 2 miles N from shore, just E of Hat Point. Detached 20- and 21-foot spots are 4 miles N and 5.2 miles NW of Hat Point, respectively. Midway between Hat Point and Oak Point, depths of 7 feet and 1 foot are 1.5 and 0.9 miles offshore, respectively. A detached 12-foot spot is 2 miles NW of Oak Point.

(100) From Sand Point, a shoal bank extends about 13 miles NW. **Little Charity Island** and **Charity Island** are on the bank about 7 and 8 miles NW of Sand Point, respectively. Between the point and the islands, the bottom is generally sandy with scattered boulders. Depths of 7 feet are available across the shoal, but the prevailing depths are less. Charity Island, low and wooded, is marked at the NW end by an abandoned lighthouse. From the island, the shoal bank extends about 3½ miles W and 4 miles N. Numerous spots with depths of 13 to 20 feet are from 3 to 5 miles NE of the island. **Charity Island Shoal Lighted Bell Buoy 5,** about 5.5 miles NW of Charity Island, marks the NW extent of the shoal bank.

(101) Entering Saginaw Bay, a course S from the lighted bell buoy leads 6.5 miles through deep water to abreast Gravelly Shoal Light, which marks the shoals off Point Lookout at the narrowest point of the deepwater channel into the bay. A 17-foot spot, marked on the W side by a lighted buoy, is 3.6 miles WNW of Charity Island and close E of the course between Charity Island Shoal Lighted Bell Buoy 5 and Gravelly Shoal Light.

(102) **Caseville Harbor, Mich.,** is at the mouth of the **Pigeon River,** about 18 miles SW of Pointe aux Barques and 6.5 miles ENE of Sand Point. A white spire in the town is prominent.

(103) **Channels.**–A dredged entrance channel leads from deep water in Saginaw Bay to the mouth of Pigeon River and thence upstream for 0.3 mile. A breakwater extends bayward from the mouth of the river on the N side of the entrance channel. The outer end of the breakwater is marked by a light and the channel is marked by buoys and a private 113.5° lighted range. In September 1997, the controlling depths were 7 feet in the N half, 2 feet in the S half, and 5½ feet at midchannel to the mouth of Pigeon River, thence 5½ feet in the N half and 5 feet in the S half of the channel to Huron Yacht Club, thence 6 feet on the centerline to the head of the project.

(104) An overhead power cable with a reported clearance of 57 feet crosses the channel at the upstream limit of the Federal project.

(105) A **slow-no wake speed** is enforced in the harbor.

(106) **Small-craft facilities.**–A Michigan State Waterways Commission marina and private marinas are in the harbor. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramp, boat hoist, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9.

(107) **Sand Point** (43°54.8′N., 83°24.0′W.) is a narrow point extending 4 miles W from about midpoint of the E shore of Saginaw Bay. Canals and approach channels have been privately dredged at the W end and along the S side of the point. Dockage for small craft is available in the canals, but the channels are subject to shoaling and caution is advised.

(108) From Sand Point SW for 28 miles to the mouth of the Quanicassee River, the southernmost point of Saginaw Bay, the shore is generally low and marshy. The shore then trends NW for 10 miles to the mouth of the Saginaw River. Above Sand Point, the E side of the bay is a sandy flat extending 8 to 10 miles offshore within the 18-foot contour. The bottom is irregular, with depths less than 10 feet scattered over the entire area.

(109) **Wild Fowl Bay** is enclosed by Sand Point on the N and by **North Island,** 2.3 miles SW of Sand Point, and **Wild Fowl Point** on the S. The bay has central depths of 6 feet or more, with much lesser depths toward shore.

(110) On the SE side of Wild Fowl Bay, a channel locally known as Wallace Stone Cut leads to a marina basin. The entrance is marked by a private lighted range. In 1977, the entrance channel had a reported controlling depth of 5 feet with 4 to 10 feet in the basin. The marina provides gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 20-ton hoist can handle 38-foot boats for hull and engine repairs.

(111) **Bay Port Harbor, Mich.,** is on the S shore of Wild Fowl Bay just E of Wild Fowl Point and about 25 miles SW of Pointe aux Barques. Commercial fishermen use the harbor. A launching ramp is available.

(112) **Channels.**–A dredged entrance channel leads S from deep water in Wild Fowl Bay to join privately maintained channels. In October 1997, the controlling depth was 2 feet in the channel.

(113) From Wild Fowl Point SW for 11.5 miles to **Fish Point** (43°43.1′N., 83°31.5′W.), a shoal bank with depths less than 6 feet extends about 3.5 miles offshore. This bank has numerous islands, the largest of which are **Heisterman Island,** 1 mile S of North Island, and **Middle Grounds Island** and **Maisou Island,** just S of Heisterman Island.

(114) **Sebewaing Harbor** is at the mouth of the Sebewaing River, on the E shore of Saginaw Bay about 12 miles S of Sand Point. A stack on the N side of the river in the village of **Sebewaing, Mich.,** is prominent.

(115) **Channels.**–A dredged entrance channel, marked by buoys, leads SE from deep water in Saginaw Bay through the mouth of the Sebewaing River and upstream to about 800 feet below the CSX railroad bridge. In April 1998, the midchannel controlling depth was 2 feet in the entrance channel to the head of the project. Depths of about 3 feet were available, with local knowledge, for another 0.75 mile, thence the river shoals to bare.

(116) **Bridge.**–A fixed railroad bridge with a clearance of 9 feet crosses the river at the village.

(117) **A slow-no wake speed** is enforced on the Sebewaing River and connecting channels and canals.

(118) From Fish Point SW to the Quanicassee River, depths less than 6 feet extend about 1 mile offshore. A marina about 8.5 miles SW of Sebewaing provides gasoline, diesel fuel, ice, electricity, sewage pump-out, and a launching ramp. A 20-ton hoist is available for minor engine repairs.

(119) **Quanicassee River,** flowing into the SE corner of Saginaw Bay, is practically closed by the bars at its mouth. Depths less than 6 feet extend 2 miles off the mouth. W of the river mouth, the 6-foot contour extends 5 miles offshore and then narrows to about 1 mile at the mouth of Saginaw River. The entrance to Quanicassee River is marked by private seasonal buoys.

(120) **Charts 14863; 14867.**–The **Saginaw River** is formed by the confluence of the Tittabawassee and Shiawassee Rivers at **Green Point** (43°23.1′N., 83°58.2′W.) at the S limit of the city of Saginaw. The river flows N for 22 miles and empties into the head of Saginaw Bay. The lower 18 miles of the river form a commercial harbor. Grain, chemicals, petroleum products, limestone, coal, sand, gravel, and cement are the major commodities handled at the ports of **Bay City, Mich.,** just above the river mouth, and **Saginaw, Mich.,** 19 miles above the river mouth. Other towns on the river are **Essexville, Mich.,** on the E side just above the mouth, and **Zilwaukee, Mich.,** and **Carrollton, Mich.,** on the W side just below Saginaw.

(121) **Prominent features.**–Two 500-foot stacks at the powerplants on the E side of the river mouth and a TV mast at Essexville are prominent.

(122) **Channels.**–A Federal project provides for a dredged entrance channel leading SW from the deep water in Saginaw Bay for about 13.5 miles to the mouth of the Saginaw River and thence upstream for about 20 miles to the ports of Bay City and Saginaw. The entrance and river channels are well marked by lighted and unlighted buoys. A **211°20′** lighted range marks the entrance channel, and a **160°** lighted range marks a reach in the lower part of the river.

(123) The Federal project depths are 27 feet in the entrance channel to the mouth of the river, thence 26 feet through the mouth, thence 25 feet to the Grand Trunk Western Railroad bridge at Bay City, thence 27 feet to the CSX railroad bridge in Saginaw, thence 16½ feet to the Holland Avenue bridge in Saginaw. Five turning basins in the river have project depths as follows: 25 feet at Essexville, 22 feet in Bay City opposite the airport, 20 feet at Carrollton, 20 feet just below the CSX railroad bridge at Sixth Street in Saginaw, 15 feet between the Grand Trunk Western Railroad bridge and the Holland Avenue bridge at Carroll Street in Saginaw. (See Notice to Mariners and latest editions of charts for controlling depths.)

(124) A **slow-no wake speed** is enforced in the Saginaw River.

(125) In August 1985, a submerged obstruction was reported to be 25 yards W of Saginaw Bay Channel Lighted Buoy 27. In 1981, a submerged obstruction was reported on the W side of the channel between Saginaw Bay Channel Range Front Light and Saginaw Bay Channel Lighted Buoy 34; caution is advised.

(126) Above the Holland Avenue bridge in Saginaw depths in the river vary from 7 to 15 feet for about 2.8 miles to Green Point.

(127) In 1977, it was reported that the **Tittabawassee River** was navigable by small boats for only about 1.5 miles above Green Point. Above that point stumps, sunken logs, and snags severely obstruct the river.

(128) The **Shiawassee River,** near Green Point, has an available depth of 5 to 6 feet, and the crooked channel across Shiawassee Flats is 15 or 16 feet deep in many places. In 1977, numerous submerged pilings were reported at the mouth of the river in the vicin-

## Structures across the Saginaw River and Tributary
### *Miles above Saginaw Bay Channel Range Front Light
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Main Channel** | | | | | | | |
| 1 | Overhead cable | Power | 0.55 | | | | 181 | |
| 2 | Overhead cable | Power | 0.93 | | | | 125 | |
| 3 | Detroit and Mackinac Ry. bridge | Railroad | 3.10 | 96 | 94 | | 7 | Swing. Note 1. |
| 4 | Belinda Street (Independence) Bridge | Highway | 3.88 | | | 150 | 22 | Bascule. 30 feet at center. |
| 5 | Grand Trunk Western RR bridge | Railroad | 4.94 | 101 | 101 | | 8 | Swing. Notes 1 and 2. |
| 6 | Woodside Street Bridge | Highway | 4.99 | | | 150 | 25 | Bascule. Note 1. |
| 7 | Veterans Memorial Bridge | Highway | 5.60 | | | 146 | 15 | Bascule. 23 feet at center. Note 1. |
| 8 | Overhead cable | Power | 5.79 | | | | 135 | |
| | Junction with West Channel | | 6.40 | | | | | |
| 9 | Lafayette St. bridge | Highway | 6.78 | | | 150 | 20 | Bascule. Note 1. |
| 10 | Cass Ave. bridge | Highway | 7.78 | | | | | Bridge removed. Piers remain. |
| 11 | Overhead cable | Power | 12.97 | | | | 142 | |
| 12 | Overhead cable | Power | 14.40 | | | | 138 | |
| 13 | Overhead cable | Power | 14.52 | | | | 136 | |
| 14 | I—75 High level bridge | Highway | 14.61 | | | 300 | 121 | Fixed. |
| 15 | Overhead cable | Power | 14.77 | | | | 130 | |
| 16 | CSX RR bridge | Railroad | 18.00 | | | 150 | 13 | Bascule. Notes 1 and 3. |
| 17 | Overhead cable | Power | 18.03 | | | | 124 | |
| 18 | Route I—675 bridge | Highway | 18.38 | | | 138 | 34 | Fixed. |
| 19 | Johnson St. bridge | Highway | 18.52 | | | 100 | 25 | Fixed. |
| 20 | Genesee Ave. bridge | Highway | 18.65 | | | 88 | 25 | Fixed. |
| 21 | Grand Trunk Western RR bridge | Railroad | 19.16 | 70 | 70 | | 12 | Swing. Notes 1 and 3. |
| 23 | Holland Ave. bridge | Highway | 19.67 | | | 113 | 20 | Fixed. |
| 24 | Court St. bridge | Highway | 20.34 | | | 107 | 32 | Fixed. |
| 25 | Rust Ave. bridge | Highway | 20.74 | 66 | 66 | | 18 | Fixed. |
| 26 | Overhead cables | Power | 21.28 | | | | 52 | |
| 27 | Douglas G. Schenck Bridge | Highway | 21.34 | | | 116 | 19 | Fixed. |
| 28 | Overhead cable | | 22.28 | | | | 30 | |
| 29 | Overhead cable | Power | 22.36 | | | | 56 | |
| | **Tittabawassee River** | | | | | | | |
| 30 | Overhead cable | Power | 23.10 | | | | 52 | |
| 31 | Overhead cable | | 23.14 | | | | 30 | |
| 32 | Consumers bridge | Highway | | | | 58 | 25 | Fixed. |
| | **West Channel** | | | | | | | |
| 33 | Overhead cable | Power | 6.72 | | | | 27 | |
| 34 | Lafayette St. bridge | Highway | 6.84 | | | 71 | 18 | Fixed. |
| 35 | Overhead cable | Power | 7.26 | | | | 32 | |
| 36 | Overhead cable | Power | 7.89 | | | | 18 | |
| 37 | Cass Ave. bridge | Highway | 7.90 | | | | | Bridge removed. Center pier remains. |
| 38 | Overhead cable | Power | 7.91 | | | | 18 | |

Note 1.—See 33 CFR 117.1 through 117.59 and 117.647, chapter 2, for drawbridge regulations.

Note 2.—The bridge will not have a tender on duty and will be left in an open position from 0300 to 1100 Tuesday through Friday and from 0300 Saturday to 1100 Monday except for one special closing usually between 1200 and 1600. A bridgetender will be on duty at all other times and proper whistle signals should be sounded to have the bridge opened for passage.

Note 3.—Maintained in the closed position. See 33 CFR 117.647 (d) and (e), chapter 2, for drawbridge regulations.

ity of Green Point. Above the flats, the Shiawassee River is very narrow and crooked, but is navigable for small boats to the junction with **Bad River**, and thence the Bad River to the village of St. Charles, 13 miles from Green Point. A highway bridge with a 19-foot fixed span and a clearance of 8½ feet crosses Shiawassee River about 6.7 miles above the mouth.

(129) The **Cass River** and **Flint River**, tributaries of the Shiawassee, are navigable by rowboats to a limited extent, being greatly obstructed by sunken logs and snags.

(130) An irregularly shaped diked disposal area is on the E side of the entrance channel to the Saginaw River about 1 mile NE of the mouth.

(131) The former dredged approach to the Saginaw River leads N from the mouth to deep water in Saginaw Bay. The channel, with a least depth of about 13, is unmarked and no longer maintained.

(132) **Fluctuations of water level.**–Each year the normal variation in level between the highest and lowest mean monthly stages in the Saginaw River is about 3 feet. In addition, spring floods and excessive rains may cause an abnormal rise of as much as 14 feet in the river at Saginaw. Occasionally a considerable change takes place within a few hours, resulting from the raising or lowering of Saginaw Bay by violent NE or SW winds. Water level information for the river may be obtained by contacting Saginaw Coast Guard Station on VHF-FM channel 16. Water levels are given in whole inches above or below chart datum.

(133) **Towage.**–A 4,000 hp tug, GREGORY J. BUSCH, is also available at Bay City. Arrangements are made through Busch Marine Services, at 517-754-2507 or 517-751-3847, or by contacting the tug on VHF-FM channel 16. Working channels include 16, 6, 10, 12, 13, 21, and 22. Two hours advance notice is requested; however, the tug is manned 24 hours a day. The tug operates on all lakes and meets vessels at any location including midlake. The tug is equipped with radar and loran and operates under any conditions. Open water rescue towing between Port Huron and De Tour Passage is available, and the tug has ice breaking capabilities.

(134) Saginaw-Bay City is a **customs port of entry.**

(135) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(136) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(137) **Saginaw River Coast Guard Station** is on the E side of the river about 1.7 miles above the mouth.

(138) **Wharves.**–The Saginaw River has numerous facilities along both sides for 18 miles above the mouth. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have highway connections, and many have railway connections. Some of the facilities have water and electrical shore-power connections.

(139) **Facilities on the E side of the river at Essexville and Bay City:**

(140) **Consumers Power Co. Dock:** E side of river mouth; 2,664-foot face; 18 feet alongside; deck height, 7 feet; open storage for 350,000 tons of coal; receipt of coal; owned and operated by Consumers Power Co.

(141) **Aetna Cement Corp. Wharf:** 2 miles above the river mouth; 850 feet of berthing space; 22 to 25 feet alongside; deck height, 7 feet; open storage for 225,000 tons of limestone and 30,000 tons of cement clinker; silo storage for 75,000 tons of cement; receipt of limestone and cement clinker; owned and operated by Aetna Cement Corp.

(142) **Carrollton Concrete Mix Corp., Essexville Dock:** just above Aetna Cement Corp. Wharf; 800-foot face; 18 to 20 feet alongside; deck height, 3 feet; 6 acres open storage; receipt of limestone; owned and operated by Carrollton Concrete Mix Corp.

(143) **Sand and Stone Dock:** 0.5 mile above Aetna Cement Corp. Wharf; 1,400-foot face; 6 to 25 feet alongside; deck height, 3 feet; about 15 acres open storage for limestone; receipt of limestone; owned and operated by Sand and Stone, Inc.

(144) **Wirt Transport Co., Bay City Stone Dock:** 0.2 mile below the Independence Highway Bridge; 2,500 feet of berthing space; 25 feet alongside; deck height, 3 to 6 feet; open storage for 220,000 tons of dry bulk commodities; one 24-inch belt conveyer with a loading rate of 200 tons of stone per hour; receipt of stone, coal, and salt by self-unloading vessel; operated by Wirt Transport Co.

(145) **Enterprise Oil and Gas Co. Wharf:** 0.15 mile below Detroit and Mackinac Railway bridge; 170 feet of berthing space with dolphins; 27 feet alongside; deck height, 7 feet; tank storage for 183,000 barrels; receipt of petroleum products; owned and operated by Enterprise Oil and Gas Co.

(146) **Bay Aggregate Dock:** 0.2 mile above Veterans Memorial Bridge; 560-foot face; 15 to 20 feet alongside; deck height, 6 feet; open storage for 35,000 tons of stone and 25,000 tons of sand; receipt of stone; owned and operated by Bay Aggregate, Inc.

(147) **Rock Products Corp. Dock:** about 0.6 mile above Veterans Memorial Bridge; 470-foot face; 12 to 15 feet alongside; deck height, 4 feet; open storage for 30,000 tons of stone; receipt of stone; owned and operated by Rock Products Corp.

(148) **Midland Contracting Co. Dock:** about 0.3 mile below Lafayette Street bridge; 970-foot face; 12 feet alongside; deck height, 4 feet; open storage for 75,000 tons of stone; receipt of stone; owned and operated by Midland Contracting Co.

(149) **Saginaw Valley Marine Terminal Dock:** about 1.1 miles above Lafayette Street bridge; about 550 feet of berthing space with dolphins; 23 feet alongside; deck height, 5 feet; 110,000 square feet covered storage; 4 acres open storage; receipt and shipment of general cargo; owned and operated by Saginaw Valley Marine Terminal and Warehouse Co. Inc.

(150) **Facilities on the W side of the river at Bay City:**

(151) **Amoco Lake Terminal:** N side of the slip about 2 miles above the river mouth; 392 feet of berthing space with piles; 18 feet alongside; deck height, 5 feet; pipelines to storage tanks, capacity 675,000 barrels; owned and operated by Amoco Amoco Oil Co.

(152) **Dow Chemical USA Lower Wharf:** 400 feet below Detroit and Mackinac Railway bridge; offshore wharf, 350 feet of berthing space with dolphins; 25 feet alongside; deck height, 6 feet; pipelines extend to tank storage, capacity over 2 million barrels; shipment of petroleum products and petrochemical; owned and operated by Dow Chemical USA.

(153) **Total Petroleum Wharf:** 0.35 mile above Detroit and Mackinac Railway bridge; offshore wharf, 120 feet of berthing space with dolphins; 23 feet alongside; deck height, 6 feet; pipelines extend to tank storage, capacity 430,000 barrels; receipt and shipment of petroleum products; owned and operated by Total Petroleum Inc.

(154) **Dow Chemical USA Upper Wharf:** 0.2 mile below Independence Bridge; offshore wharf, 275 feet of berthing space with dolphins; 20 feet alongside; deck height, 5 feet; pipelines extend to tank storage, capacity 251,000 barrels; shipment of chemicals and petrochemicals; receipt of liquid fertilizer; owned by International Terminals, Inc, and operated by Dow Chemical USA.

(155) **Wirt Stone Co. Dock:** immediately above Independence Bridge; 2,500-foot face; 15 feet alongside; deck height, 3 to 6 feet; open storage for 220,000 tons of material; receipt of stone, coal, and salt; owned and operated by Wirt Transport Co.

(156) **Fletcher Marine Terminal Dock:** about 0.5 mile above Wirt Stone Co. Dock; offshore wharf, 220 feet of berthing space with dolphins; 25 feet alongside; deck height, 7 feet; pipeline extends to storage tank, capacity 8,000 tons; receipt of liquid fertilizer; owned and operated by Fletcher Oil Co., Inc.

(157) **Facilities on the E side of the river at Saginaw:**

(158) **Saginaw Asphalt Paving Co., Buena Vista Dock:** 0.25 mile above Route I–75 bridge; 1,050 feet of berthing space along dolphins; 20 feet alongside; deck height, 6 feet; 14 acres open storage; receipt of stone; owned and operated by Saginaw Asphalt Paving Co.

(159) **Wirt Saginaw Stone Dock:** 0.5 mile above Route I–75 bridge; 1,800-foot face; 18 to 20 feet alongside; deck height, 4 feet; 28 acres open storage; receipt of stone, salt, and coal; owned by Alice Wirt and operated by Bay Dock Co., Inc.

(160) **General Motors Metal Castings Plants, Sand Dock:** 0.3 mile below Sixth Street bridge; 1,500-foot face; 20 to 22 feet alongside; deck height, 2 to 4 feet; open storage for 70,000 tons of sand; receipt of sand; owned and operated by Central Foundry Division, General Motors Corp.

(161) **Saginaw Rock Products Co. Dock:** 0.4 mile below Chesapeake and Ohio Railway bridge; 1,050 feet of berthing space; 10 to 22 feet alongside; deck height, 6 feet; open storage for 120,000 tons of material; receipt of stone and potash; owned and operated by Saginaw Rock Products Co.

(162) **Facilities on the W side of the river at Zilwaukee, Carrollton, and Saginaw:**

(163) **Clawson Concrete Co. Dock:** 1.1 miles below the Route I–75 bridge; 1,100-foot face; 20 to 23 feet alongside; deck height, 7 feet; 10 acres open storage; receipt of stone and potash; owned and operated by Clawson Concrete Co.

(164) **Consumers Energy Co., Zilwaukee Dock:** 0.4 mile below Route I–75 bridge; 1,115-foot face; 20 feet alongside; deck height, 8 feet; receipt of construction materials; owned and operated by Consumers Energy Co.

(165) **Michigan Elevator Exchange Wharf:** 1.1 miles above Route I–75 bridge; 556 feet of berthing space with dolphins; 20 feet alongside; deck height, 6 feet; grain elevator, capacity over 2½ million bushels; grain gallery with three vessel-loading spouts, loading rate 30,000 bushels per hour; shipment of grain; owned and operated by Michigan Elevator Exchange Division of Farm Bureau Services, Inc.

(166) **Luntz Corp. Dock:** 0.2 mile below Sixth Street bridge; 540-foot face; 19 feet alongside; deck height, 12 feet; cranes to 25 tons; open storage for 35,000 tons of material; receipt of potash and miscellaneous bulk materials; owned and operated by Luntz Corp.

(167) **Lafarge Corp., Sixth Street Dock:** immediately below Sixth Street bridge; 545-foot face; 20 feet alongside; deck height, 10 feet; storage silos for 46,000 barrels of cement; receipt of bulk cement; owned and operated by Lafarge Corp.

(168) **The Pillsbury Co., Carrollton Wharf:** 0.2 mile above Sixth Street bridge; 550 feet of berthing space with dolphins; 20 feet alongside; deck height, 4 feet; 3-million-bushel grain elevator; vessel-loading spout; shipment of grain owned and operated by The Pillsbury Co., Edible Protein Division.

(169) **Saginaw Asphalt Paving Co., Carrollton Dock:** 0.2 mile above Sixth Street bridge; 924 feet of berthing space; 20 feet alongside; deck heights, 6 and 11 feet; 10 acres open storage; receipt of stone; owned and operated by Saginaw Asphalt Paving Co.

(170) **Saginaw Core Sand Co. Dock:** immediately below the Chesapeake and Ohio Railway bridge; 850 feet of berthing space; 10 to 20 feet alongside; deck height, 8 feet; open storage for 100,000 tons of stone; receipt of stone; owned and operated by Saginaw Core Sand Co.

(171) **Supplies.**–Marine supplies and provisions are available at firms in Bay City and Saginaw. Bunker C and diesel oil are available at the Dow Chemical Refinery Wharf in Bay City. Water is available at some wharves.

(172) **Repairs.**–Above-the-waterline repairs, some engine repairs, and a 100-ton marine railway are available at a marine contractor at the S end of Middle Ground, about 8 miles above the river mouth in Bay City.

(173) **Small-craft facilities.**–Marinas are on the W side of the river 1.6 miles above the mouth, just N of the Grand Trunk Western Railroad Bridge, on the E side opposite Middle Ground, and at Saginaw 1.5 miles below Green Point. A Michigan State Waterways Commission marina is in the harbor. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launch ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. Hoists to 50 tons are available for hull and engine repairs.

(174) **Communications.**–Bay City and Saginaw have good highway and rail freight connections. Passenger and freight service are available at the Tri-City Airport, 12 miles SW of the river mouth.

(175) **Chart 14863.**–From the mouth of the Saginaw River the W shore of Saginaw Bay extends 3 miles NW, thence NNW about 7 miles to **Nayanquing Point,** thence N about 11 miles to the mouth of the **Saganing River,** thence NNE about 5 miles to **Wigwam Bay,** thence E about 9 miles to Point Au Gres, and thence N and E for about 8 miles to Point Lookout. The shoreline in this reach is generally low and marshy with numerous cottages. The 18-foot contour extends from 5 miles N of the Saginaw River mouth NW to 3 miles E of Nayanquing Point and thence NE to Point Lookout, passing 1 mile off Point Au Gres. The flat inside the 18-foot contour is sandy and stony and generally shelving, with depths of 12 feet or less within 1 mile of that contour and depths of less than 7 feet extending over 1 mile off most of the shoreline. Off the mouths of some of the rivers in this reach, very shallow bars project well out over the flat.

(176) **Charts 14863, 14867.**–The **Kawkawlin River,** emptying into Saginaw Bay about 2 miles NW of the mouth of the Saginaw River, is entered by a dredged channel that leads just inside the mouth. In September 1998, the controlling depth was 2½ feet (4½ feet midchannel) to the mouth of the river. Continually changing conditions have been reported at the mouth and the approach channel is marked by buoys that are shifted to mark the best water. An overhead power cable with a clearance of 51 feet crosses the river about 0.3 mile above the entrance. In September 1989, bridge ruins were reported about 0.7 mile above the entrance. A fixed highway bridge 0.2 mile further upstream has a reported

clearance of 10 feet. A **slow-no wake speed** is enforced on the river.

(177) **Chart 14863.**–The **Pinconning River** is about 5.5 miles N of Nayanquing Point. Two water tanks in the village of **Pinconning, Mich.,** about 2.5 miles W of the mouth of the river, are prominent. A marina on the S side of the river mouth provides gasoline, ice, a launching ramp, and limited engine repairs. In 1977, the reported controlling depth was 2 feet in the approach with 8 feet alongside the marina docks.

(178) **Pinconning Bar,** extending about 3 miles E from the mouth of the Pinconning River, and **Saganing Bar,** extending about 3.5 miles E from the mouth of the Saganing River, are very shallow banks with about 2 feet near their outer ends.

(179) Off the **Rifle River,** about 3.5 miles W of Point Au Gres, **Rifle Bar,** a shoal area with 1 or 2 feet of water, extends SE about 3 miles, with the 18-foot contour about 0.5 mile farther out. The Rifle River is navigable by canoes for about 10 miles above the village of Omer, Mich.

(180) **Point Au Gres** is on the W side of Saginaw Bay about 25 miles NNE of the mouth of Saginaw River. The bottom is quite shallow and rocky to 1 mile off around the point, with 30 feet close outside of this limit. A buoy marks a submerged obstruction just off the end of the point.

(181) Close NW of Point Au Gres, a 30-foot-wide canal provides refuge for small craft. In 1977, the reported centerline controlling depth in the canal was 4 feet. The entrance to the canal is marked by private buoys. Gasoline and water are available in the canal.

(182) Between Point Au Gres and Point Lookout, 6.5 miles NE, a shallow bight has depths less than 18 feet extending 2 miles from its head. **Au Gres River** empties into the head of the bight.

(183) **Point Lookout Harbor** is a harbor of refuge at the mouth of the Au Gres River about 2 miles S of the city of **Au Gres, Mich.**

(184) **Channels.**–A dredged entrance channel leads NW from deep water in Saginaw Bay between parallel piers to the mouth of the river and thence upstream for about 2 miles to U.S. Route 23 highway bridge. The approach channel is marked by buoys and the outer ends of the piers by lights. In May 1998, the controlling depth was 6 feet (7 feet at midchannel) from the bay to a point about 0.8 mile above the outer ends of the pier, thence 1 foot (2½ feet at midchannel) to just below the highway bridge with shoaling to less than 1 foot immediately S of the bridge.

(185) **Bridges.**–Two overhead power cables with a minimum clearance of 68 feet cross the river 2.3 miles above the outer ends of the piers. The U.S. Route 23 highway bridge, about 0.5 mile upstream, has a fixed span with a horizontal clearance of 15 feet on either side of the center pier and a vertical clearance of 8 feet.

(186) A **slow-no wake speed** is enforced on the Au Gres River.

(187) **Small-craft facilities.**–A marina on the S side of the river mouth and a Michigan State Waterways Commission facility just below the Route 23 bridge provide transient berths, gasoline, diesel fuel, water, electricity, marine supplies, sewage pump-out, launching ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. Minor repairs are available at the marina. In 1977, depths of 2 to 5 feet were reported alongside the marina berths.

(188) At **Point Lookout** (44°03.0′N., 83°34.8′W.), also known as **Gravelly Point,** a shoal with depths of 5 to 18 feet extends SE for 3 miles. **Gravelly Shoal Light** (44°01.2′N., 83°32.3′W.), 75 feet above the water, is shown from a white square tower on a cylindrical base near the outer end of the shoal; a fog signal and radiobeacon are at the light. This shoal is important because it restricts the available deep water between it and the Charity Islands for vessels making the Saginaw River. Vessels should not pass between the light and the point. Protection from N and W winds with holding ground in 20 to 30 feet, mud bottom, is close S of Point Lookout, but fish net stakes obstruct this area.

(189) From Point Lookout to **Tawas Point** (44°15.1′N., 83°27.4′W.), 15 miles NNE, the shoreline is bordered by shoals extending 0.5 to 1.2 miles off. A 2-foot shoal is 0.6 mile SE of **Whitestone Point,** 4.5 miles N of Point Lookout. About 10 miles N of Point Lookout, shoals with depths of 4 to 7 feet extend 1 mile off. The shore in this reach is low from Point Lookout to Whitestone Point, thence bluff to Tawas City, and becomes low again to Tawas Point.

(190) At **Alabaster, Mich.,** 9.5 miles N of Point Lookout, the United States Gypsum Co. operates an offshore wharf for loading crushed gypsum. A 6,800-foot aerial tramway connects the 310-foot wharf and the shore. The tramway cable, supported by eight towers, has a minimum clearance of 30 feet. The wharf has a deck height of 9 feet, and in 1977, had a reported depth of 23 feet alongside. The approach to the wharf is marked by a private **270°** lighted range on the outer end of the wharf and on a crib off the end of the wharf. The wharf is an open roadstead with protection from only W winds. Small craft should keep clear of the wharf because of the danger from falling rocks.

(191) At **Port Gypsum,** 3.5 miles N of Alabaster, a 1,078-foot conveyor system connects the shore and a 650- by 80-foot offshore gypsum-loading wharf of the National Gypsum Co. The wharf has a deck height of 9 feet, and, in 1977, had reported depths of 22 feet alongside. There is open storage for 60,000 tons of gypsum. A privately dredged channel, marked by private buoys and a **293°30′** lighted range, leads from deep water in Saginaw Bay to a turning basin at the wharf. In 1977, the reported controlling depth was 20 feet in the channel and basin.

(192) **Tawas Bay** is a bight about 4 miles wide, enclosed on the E by Tawas Point and on the N and W by the curving mainland. It is an excellent harbor, affording secure anchorage at its head in all but SW winds. The 18-foot contour is about 1.3 miles off the NW shore of the bay decreasing to 0.5 mile off the N shore. Inside this contour, the depths shoal gradually toward shore. On the E side of the bay, a sand flat with depths of 1 foot extends 0.4 mile SW and about 0.7 mile W from Tawas Point. At the NW limit of the flat, marked by a buoy, the depths increase rapidly to 20 feet or more. A lighted buoy off the SW limit of the flat marks the entrance to Tawas Bay.

(193) **Tawas Light** (44°15.2′N., 83°26.9′W.), 70 feet above the water, is shown from a white conical tower with attached dwelling on Tawas Point; a fog signal is 0.6 mile SW of the light. The light has a **045°–135°** red sector which covers the sand flat on the W side of the point.

(194) To anchor in Tawas Bay, vessels should round the lighted buoy SW of Tawas Point, and from a point about 800 feet W of the buoy, head **000°** until Tawas Light bears **112½°**; thence change course to about **060°**. Anchor about 1 mile **315°** from Tawas Light in about 22 feet of water, sand and clay bottom.

(195) **Tawas City, Mich.,** is on the NW side of Tawas Bay at the mouth of the **Tawas River.** One water tank in the city is prominent. In 1977, the reported controlling depth across the bar at the river mouth was 2 feet. A private **326°** lighted range marks the entrance to the river. A **slow-no wake speed** is enforced on the Tawas River. There are limited facilities for small craft in the lower part of the river. A marina at the mouth provides transient

berths, gasoline, water, ice, electricity, some marine supplies, a launching ramp, and minor engine repairs.

(196) **East Tawas, Mich.**, is on the N shore of Tawas Bay about 2 miles NE of Tawas City. The Michigan State Waterways Commission dock provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, launch ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. The northeasternmost arm of the dock has reported depths of 12 feet alongside. The dock is protected by a breakwater extension that should not be approached closely because of stone riprap. The breakwater extension is marked at the NE end by a light. Two fish docks in fair condition are about 0.3 mile E of the State dock. In 1963, depths of 3 feet were available alongside.

(197) A dredged channel leads N around the end of the breakwater to a triangular shaped basin off the end of the Michigan State Waterways Commission dock. In July 1997, the controlling depths were 12 feet in the entrance channel except for shoaling to 11 feet along the W edge near the end of the breakwater, thence 9 to 10 feet in the basin and shoaling to 8 feet in the NW corner of the basin.

(198) **Tawas Coast Guard Station** is on Tawas Point 0.7 mile NE of Tawas Light.

(199) A marina on the W side of the inner end of Tawas Point provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 15-ton lift is available for hull and engine repairs. The entrance to the marina is marked by private daybeacons and a private **128°** lighted range. In 1977, the reported controlling depths were 5 feet in the entrance channel and basin. A yacht club basin marked by a private **165°** lighted range is just SW of the marina.

(200) From Tawas Point to **Au Sable Point** (44°20.0′N., 83°20.4′W.), about 8 miles NE, shoals and submerged net stakes extend about 1.3 miles offshore. Shoals with depths to 14 feet extend off the same distance around Au Sable Point. A lighted buoy is 2.7 miles ESE of the point.

(201) From Au Sable Point N for 5 miles to the mouth of Au Sable River, the shore is low with no prominent landmarks. Along this stretch, shoals with depths of 9 to 15 feet extend as much as 2.1 miles offshore. In September 1987, a sunken wreck was reported about 1.7 miles eastward of Au Sable Point.

(202) **Au Sable Harbor**, also known as **Oscoda**, is a harbor of refuge used mainly by pleasure craft at the mouth of the **Au Sable River**. The towns of **Au Sable, Mich.**, and **Oscoda, Mich.**, front the W and E sides of the river, respectively. A prominent black water tank is 1.2 miles NW of the mouth of the river; the tank is lighted.

(203) **Channels.**–A dredged entrance channel enters the river from Lake Huron between parallel piers and leads upstream for about 0.2 mile to the U.S. Route 23 highway bridge. The outer ends of the piers are marked by lights; a fog signal is at the S light. In September 1998, the controlling depths in the entrance channel were 4½ feet (6½ feet at midchannel) to the inner basin; thence 2½ feet in the N part and 4½ feet in the S half of the basin to the bridge.

(204) Depths of about 2 to 3 feet can be carried for about 1 mile above the dredged channel.

## Structures across Au Sable River
### **Miles above North Pierhead Light*
### ***Clear width in feet proceeding upstream*

| *No.* | *Location and Name* | *Kind* | *Miles** | *Clear width in feet of draw or span openings*** | | | *Clear height in feet above Low Water Datum* | *Remarks* |
|---|---|---|---|---|---|---|---|---|
| | | | | *Right* | *Left* | *Center* | | |
| 1 | U.S. Route 23 bridge | Highway | 0.42 | | | 77 | 23 | Fixed. |
| 3 | Overhead cable | Power | 0.44 | | | | 44 | |
| 4 | Overhead cable | Television | 0.58 | | | | 28 | |
| 5 | Overhead cable | | 0.64 | | | | 24 | |
| 6 | Overhead cable | | 1.06 | | | | 28 | |
| 7 | Overhead cable | Telephone | 1.08 | | | | 28 | |
| 8 | Mill St. bridge | Highway | 1.09 | 45 | 45 | 48 | 12 | Fixed. Center span is navigable. |
| 9 | Adams Ave bridge | Highway | 1.76 | | | 35 | 9 | Fixed. |
| 10 | Detroit and Mackinac Ry. bridge | Railroad | 2.76 | | | | | Fixed. Data not available. |
| 11 | Wurtsmith bridge | Highway | 6.46 | | | 33 | 13 | Fixed. |

(205) In July 1987, a sunken wreck was reported just N of the entrance channel in about 44°24′27″N., 83°18′53″W.

(206) **Currents.**–There is normally only a slight current through Au Sable Harbor, but strong currents prevail in the harbor when the dam a short distance above the harbor is being used for power generation.

(207) A **slow-no wake speed** is enforced on the Au Sable River.

(208) **Small-craft facilities.**–Marinas above the Route 23 bridge provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp.

(209) **Charts 14863, 14864.**–From the mouth of Au Sable River to Sturgeon Point, 21 miles N, shoals with depths less than 18 feet, and with numerous rocky patches of 12 to 16 feet near the outer limits, extend as much as 2.7 miles offshore. Deep-draft vessels should give this stretch a berth of 3 miles. The outermost danger is a boulder, covered 16 feet, 10.5 miles NNE of Au Sable River mouth. The shore in this reach is low for about 13 miles N of Au Sable to just N of the village of **Greenbush, Mich.,** where high bluffs begin a short distance back from shore and continue N past Sturgeon Point.

(210) **Oscoda Aero Light,** maintained by the U.S. Air Force at Wurtsmith Air Force Base, is shown from a checkered water tank 3.4 miles NNW from the Au Sable River mouth.

(211) **Caution.**–A special use airspace, bounded by the following coordinates,

(212) 45°17′00″N., 83°00′00″W.;

(213) 45°20′24″N., 82°31′18″W.;

(214) 44°31′00″N., 82°19′54″W.;

(215) 44°27′42″N., 82°47′08″W.,

(216) is used periodically for air to air gunnery practice from the surface to an altitude of 45,000 feet from sunrise to sunset. The using agency is the Commander, Permanent Field Training Site Detachment, Phelps-Collins ANGB, Alpena, Mich., and the controlling agency is Minneapolis ARTC Center, Federal Aviation Administration.

(217) **Chart 14864.–Harrisville Harbor,** about 17 miles N of the Au Sable River, serves the town of **Harrisville, Mich.,** and affords the only safe refuge for light-draft vessels between Au Sable and Alpena, Mich. The harbor provides adequate protection from all winds, but NE storms cause large swells in the harbor. A silver water tank on high ground about 0.7 mile W of the harbor is prominent.

(218) **Channels.**–A dredged entrance channel leads SW from Lake Huron between two breakwaters to a harbor basin. The outer ends of the breakwaters are marked by lights.

(219) In October 1997, the controlling depth was 3½ feet (7 feet at midchannel) to the basin, thence depths of 10 feet were available in the basin. The remainder of the basin is maintained by private interests.

(220) **Small-craft facilities.**–A public dock in the SW part of the harbor, operated by the Michigan State Waterways Commission and the city of Harrisville, provides transient berths, gasoline, diesel fuel, water, electricity, pump-out, launching ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. Minor engine repairs are available nearby.

(221) About 0.5 mile N of Harrisville Harbor, Lakeshore Terminal and Pipeline Co. operates an offshore terminal for receiving petroleum products. Vessels tie up to mooring buoys in about 40 feet of water 1.5 miles offshore. A submerged pipeline extends from the offshore facility to a 350,000-barrel storage tank facility on shore. A private **270°** lighted range on shore at the inner end of the pipeline marks the approach to the facility, and a private lighted buoy marks the outer end of the pipeline.

(222) **Sturgeon Point Light** (44°42.7′N., 83°16.3′W.), 69 feet above the water, is shown from a white conical tower with attached dwelling on **Sturgeon Point,** 26 miles N of Au Sable Point and 3.8 miles N of Harrisville Harbor. A shoal with a depth of 8 feet near its outer end extends 1.5 miles NE from the point.

(223) From Sturgeon Point, the shoreline trends N for 12 miles to South Point, the S entrance point to Thunder Bay. This stretch should be given a berth of 3 miles to avoid numerous submerged rocks inshore, and off-lying shoals with depths of 12 to 20 feet. The outermost shoal, 5 miles N of Sturgeon Point, extends 2.5 miles offshore. Off the mouth of **Black River,** 4.5 miles S of South Point, foul ground with submerged rocks and depths less than 8 feet extends 1.4 miles E and 2 miles NE, beyond **Black River Island.** Two sunken wrecks and a reported obstruction are about 2.5 miles E of the river mouth.

(224) **Thunder Bay** is a large bight on the W side of Lake Huron; the mouth of the bay is 10 miles wide between **North Point** and **South Point. Thunder Bay Traffic Lighted Bell Buoy,** 3 miles S of North Point, marks the entrance to the bay. The bay provides shelter in all but SE weather with good holding ground generally near the shores. The N shore from North Point to **Whitefish Point** provides a good lee in NE gales with good holding ground close to shore in depths of 25 to 30 feet, clay and sand bottom. Submerged net stakes and two wrecks obstruct this area.

(225) The S part of Thunder Bay, from South Point WNW to **Devils River,** is filled with shoals and submerged rocks extending 2.5 miles offshore. **Scarecrow Island,** 2 miles N of South Point, is near the outer edge of the shoal area.

(226) **Ossineke,** on the SW side of Thunder Bay, is just above the mouth of Devils River. The mouth of the river is partially protected by a breakwater. In September 1981, the controlling depth in the river was reported to be less than 4 feet; the river is subject to shoaling and should not be entered without local knowledge. A pier about 1,000 feet inside the mouth can provide fuel for small craft.

(227) From about 1 mile N of Devils River N to the vicinity of Sulfur Island, depths of 17 feet are within 0.5 mile of shore. A sandy flat with depths less than 12 feet connects the mainland and **Sulfur Island,** off the mouth of **Squaw Bay.** A rocky ledge with a depth of 1 foot near its outer end extends about 1 mile N from Sulfur Island to abreast **Partridge Point,** the N entrance point to Squaw Bay. Detached shoals with depths of 6 to 11 feet are 1 mile E and 1.5 miles SE of Sulfur Island. From Partridge Point N for 3.5 miles to the mouth of Thunder Bay River, numerous detached shoals extend 2 miles offshore. A 4-foot spot and an 8-foot spot are 1.5 and 2.5 miles NNE of Partridge Point, respectively. Numerous submerged net stakes are in deep water within 2 miles NE and E of Partridge Point.

(228) A marina in a basin on the N side at the inner end of Partridge Point provides gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and a launching ramp. A 50-ton mobile lift is available for hull and engine repairs. The entrance is protected by jetties. The outer end of the S jetty is marked by a private light. In 1983, the reported controlling depth was 6 feet in the entrance channel and basin. A buoy reportedly marks a reef 200 yards NE of the entrance.

(229) N of the marina, between Partridge Point and **Bare Point,** the bay is very shallow and foul.

(230) **Whitefish Bay** is a shallow bight about 2 miles E of the mouth of Thunder Bay River. From Whitefish Point, on the E side of Whitefish Bay, SE for 5 miles to North Point, there is deep

water within 1 mile of shore. However, this reach has numerous submerged net stakes and several obstructions. A wreck covered 21 feet and a 22-foot spot are 1.7 and 2.9 miles S of Whitefish Point, respectively. An obstruction, with unknown depth over it, is about 1.9 miles SSW of the point. A shoal with a least depth of 5 feet near its outer end extends 1.5 miles SE from North Point. The outer end of the shoal is marked by a buoy.

(231) **Alpena Harbor,** serving the city of **Alpena, Mich.,** is on the NW shore of Thunder Bay at the mouth of **Thunder Bay River.** Commerce at the port is mainly salt, coal, gasoline, and bulk cement. Prominent are stacks, tanks, and a spire in town, and stacks at the cement plant E of town.

(232) **Alpena Light** (45°03.6′N., 83°25.4′W.), 44 feet above the water, is shown from a red skeleton tower, upper part enclosed, on a crib on the N side of the river mouth. A fog signal is at the light. Because of protective riprap, the light should not be passed close aboard even by vessels of shallow draft.

(233) **Channels.**–A dredged entrance channel, marked by a light and buoys, leads NW from the deep water in Thunder Bay through the mouth of Thunder Bay River to a turning basin 0.7 mile above the mouth. The channel enters the river on the N side of a pier that extends from the S side of the mouth. In October 1997, the controlling depths were 17 feet (18 feet at midchannel) to the mouth of the river, thence 14 feet (17 feet at midchannel) to the turning basin with depths of 13 to 15 feet in the N half and 15 feet in the S half of the basin.

(234) From near the outer end of the dredged entrance channel, about 1.5 miles SE of the river mouth, a privately dredged channel extends 1.3 miles NNW to a basin at the Lafarge Corp. The channel is marked by a private **344°** lighted range and by private buoys placed 50 feet outside the channel limits. In 1977, the channel and basin had a reported controlling depth of 23 feet.

(235) About 0.6 mile SE of the river mouth, another privately dredged channel extends 0.6 mile N to the W facility of Lafarge Corp. The channel is marked by a private **358°** lighted range. In 1977, the reported controlling depth in the channel was 17 feet.

(236) **Bridges.**–The Second Avenue highway bridge crossing the river 0.4 mile above the mouth has a bascule span with a clearance of 12 feet. (See **33 CFR 117.1 through 117.59 and 117.655**, chapter 2, for drawbridge regulations.) An overhead cable 0.8 mile above the river mouth has a clearance of 29 feet. The Ninth Avenue fixed highway bridge 1 mile above the mouth has a clearance of 12 feet.

(237) **Fluctuations of water level.**–The annual range of fluctuation in Thunder Bay River is about 3½ feet. Day-to-day variations caused by wind and barometric pressure changes may amount to more than 1 foot. Strong N or S winds will occasionally cause considerable change within a few hours.

(238) **Weather, Alpena and vicinity.**–Alpena, MI, located on the southwest shore of Lake Huron and in the northeastern part of the state, is at the head of Thunder Bay. Thunder Bay opens on Lake Huron in a southeasterly direction. The location averages about six days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 80°F (26.7°C) and an average minimum of 54°F (12.2°C). January is the coolest month with an average high of 27°F (-2.8°C) and an average minimum of 9°F (-12.8°C). The highest temperature on record for Alpena is 103°F (39.4°C) recorded in June 1995 and the lowest temperature on record is -37°F (-38.3°C) recorded in February 1979. About 177 days each year experience temperatures below 32°F (0°C) and an average 35 days each year records temperatures below 5°F (-15°C). Every month has seen temperatures below 35°F (1.7°C) and every month except July (extreme minimum of 34°F (1.1°C) recorded in July 1965) has recorded temperatures below freezing (0°C).

(239) The average annual precipitation for Alpena is 28.75 inches (730 mm) which is fairly evenly distributed throughout the year. Precipitation falls on about 231 days each year. The wettest month is August with 3.45 inches (88 mm) and the driest, February, averages only 1.24 inches (31.5 mm). An average of 30 thunderstorm days occur each year with July and August being the most likely months. Snow falls on about 116 days each year and averages about 86 inches (2184 mm) each year. January averages nearly 22 inches (559 mm) per year and December, nearly 20 inches (508 mm). Fifteen inch (381 mm) snowfalls in a 24-hour period have occurred in each month November, December, January, and March. About 18 days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June, July, and August. Fog is present on average 158 days each year and is rather evenly distributed throughout the year with a slight minimum during the winter season and a slight maximum during August.

(240) The prevailing wind direction in Alpena is the west-northwest. Late winter through spring is the windiest period but a maximum gust of 52 knots occurred in August 1988.

(241) (See page T-9 for **Alpena climatological table.**)

(242) Alpena is a **customs station.**

(243) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(244) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(245) **Harbor Regulations.**–A **slow-no wake speed** is enforced in Alpena Harbor. The Chief of Police, who acts as **harbormaster,** enforces the harbor regulations. Copies of the regulations may be obtained from Chief of Police, City Hall, Alpena, Mich. 49707.

(246) **Towage.**–Tugs are available from Saulte Ste. Marie. (See Towage under Saulte Ste. Marie.)

(247) **Wharves.**–Alpena has three active deep-draft facilities. The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operators.)

(248) **Lafarge Corp. Wharf:** in basin 1 mile ENE of the mouth of Thunder Bay River; 1,000-foot wharf on E side of basin; two 500-foot wharves at N end of basin; 23 feet alongside; deck heights, 7 feet; open storage for 350,000 tons of coal; silo storage for 200,000 tons of cement; loading spouts at E wharf, maximum rate 6,000 tons per hour; receipt of coal, shipment of bulk cement; owned and operated by Lafarge Corp.

(249) **Abitibi Corp. Wharf:** N side of mouth of Thunder Bay River; vessels usually lay in channel and tie up to bollards along 300-foot face; 16 to 22 feet alongside; open storage for 40,000 tons of coal; receipt of coal; owned and operated by Abitibi Corp.

(250) **Alpena Oil Co. Wharf:** S side of mouth of Thunder Bay River; about 700-foot face; 17 feet alongside; deck height, 3½ feet; open storage for 25,000 tons of salt; pipeline connection at dock; receipt of salt and gasoline; owned and operated by Alpena Oil Co.

(251) **Small-craft facilities.**–A marina developed by the Michigan State Waterways Commission is entered from the S side of the main channel at the mouth of Thunder Bay River. The entrance is marked by private lights. In September 1992, the reported controlling depth was 8 feet in the entrance and the basin. Gasoline, berths, diesel fuel, water, electricity, sewage pump-out facilities, marine supplies, launching ramp, and harbormaster services are

available. The harbormaster monitors VHF-FM channels 16 and 9. A 25-ton hoist is available for hull and engine repairs.

(252) **Charts 14864, 14869.**–From North Point, the broken shoreline, low and wooded, stretches generally NNW for 2.5 miles to Presque Isle. This stretch has numerous off-lying islands and detached shoals.

(253) **Thunder Bay Island,** 3 miles ENE of North Point, is the outermost of a group of islands connected to shore by a shallow bank with numerous rocks, submerged and awash. **Thunder Bay Island Light** (45°02.2′N., 83°11.7′W.), 63 feet above the water, is shown from a white conical tower with attached dwelling on the SE shore of the island. A fog signal is at the light. A shoal with depths of 2 feet extends 0.2 mile SE from the island. Deep-draft vessels should not pass inside Thunder Bay Island. The E side of the island is deep-to. A wreck, covered 43 feet, is 13.6 miles ESE of Thunder Bay Island Light.

(254) **Sugar Island,** just W of Thunder Bay Island, is 2 miles NE of North Point. **Gull Island** is just N of Sugar Island. The passage between Sugar Island and North Point should only be used by small craft with local knowledge, because a rocky ledge makes out from the N side of the point almost to the island.

(255) Between Sugar Island and Thunder Bay Island is a small area of shelter from NW, NE, and E winds with good holding ground in 6 to 10 feet. Entrance to this area is from S; it is unsafe to enter from N because of a shoal and small islet between the NW end of Thunder Bay Island and Gull Island. The holding ground S of Sugar Island and SW of Thunder Bay Island is not good, rock and stone bottom.

(256) **Misery Bay** is a bight between the N side of North Point and **Potter Point** (45°05.6′N., 83°18.2′W.), 3 miles NNW. The bay is extremely shoal and filled with rocks and islands.

(257) From Potter Point NNW for 7 miles to abreast Middle Island, the shoreline is irregular and shallow water extends generally less than 0.7 mile offshore. A boulder, covered 13 feet, is about 1 mile E of Potter Point. Submerged net stakes are 1 to 2 miles offshore. **Stonycroft Point,** 1 mile N of Potter Point, is marked by a private light. Three piers and a launching ramp are on the S side of the point.

(258) A large boulder bank with least depths of 22 to 24 feet is from 3 to 7.7 miles NE of Potter Point. The shoal is in the path of through traffic and is a danger to deep-draft vessels, especially during heavy weather. A visible wreck is near the NE extremity of the bank. In 1970, a cargo boom was reported extending 3 feet above the water 300 feet SW of the wreck. A submerged wreck is about 100 feet E of the visible wreck. A lighted buoy with a racon 0.2 mile ESE of the wreck marks the NE extremity of the bank.

(259) **Middle Island** is about 1.5 miles offshore about 6.5 miles N of Potter Point. **Middle Island Light** (45°11.6′N., 83°19.3′W.), 78 feet above the water, is shown from a white conical tower, orange bands in middle, with detached dwelling on the E side of the island. The island is surrounded on all but the NE side by flats with depths less than 6 feet that extend about 0.2 mile off. A 5-foot shoal is about midway between the island and the mainland, and there are other patches with depths 9 to 12 feet. Passage through this area is not recommended without local knowledge. A small ledge with rocks that uncover is 0.6 mile SE of Middle Island. A lighted buoy is off the E side of the ledge and marks the E extent of the shallows surrounding Middle Island.

(260) There is anchorage SW of Middle Island with protection from S through W to NE winds in fair holding ground, clay and boulder bottom. NW of the island there is protection from SE winds in good holding ground, mud and sand bottom. When using these anchorages, give the island sufficient berth to avoid the surrounding flats.

(261) **Rockport, Mich.,** about 2.4 miles WNW of Middle Island, is a small private harbor used primarily by sport fishermen. A small point of land protects the harbor on the E. The submerged remains of a former sand and gravel breakwater extend 500 feet N from the point. The area is very shoal and should be avoided. The pier and detached cribs of a former limestone loading dock are in the harbor. The inner crib is marked by a private light. The outer crib is in ruins and submerged. A basin SE of the pier has a natural launching ramp.

(262) **False Presque Isle Harbor,** 3 miles N of Rockport, is a secure harbor protected on the N by **False Presque Isle** (45°16.0′N., 83°24.0′W.), a nearly detached body of land that projects E from shore. The harbor provides protection from SW through N to NE winds with fair anchorage in depths of 20 to 30 feet. The S side of the harbor is bordered by shoals with depths of 7 to 10 feet that extend 1.2 miles offshore. An 18-foot shoal is 0.9 mile SE of False Presque Isle in the center of the harbor approach. A boulder, covered 15 feet, is 0.5 mile SE of the 18-foot shoal.

(263) From False Presque Isle, the shoreline extends NW for about 6 miles to Presque Isle. Along this stretch deep water is within 0.4 mile of shore except in the shallow bight on the NW side of **South Albany Point** (45°19.1′N., 83°27.2′W.).

(264) **Stoneport, Mich.,** about 2 miles NW of False Presque Isle, is a private harbor operated by the Presque Isle Corp. for the shipment of limestone. An L-shaped breakwater extends from shore 1,000 feet NE, thence 1,200 feet SE. A 928-foot dock with a deck height of 12 feet is along the inner side of the SE arm of the breakwater. The facility has open storage for 60,000 tons of limestone, and a conveyor system can load vessels at 5,500 tons per hour. In 1978, the reported controlling depth alongside was 25 feet. **Stoneport Light** (45°17.8′N., 83°25.1′W.), 55 feet above the water, is a private aid shown from a white cylindrical structure on the outer end of the dock. Private buoys mark the SW limit of the deep water in the dock area. A buoy about 0.8 mile SE of Stoneport Light marks the harbor approach.

(265) **Presque Isle,** about 25 miles NNW of North Point, is a peninsula almost completely detached from the mainland. **Presque Isle Light** (45°21.4′N., 83°29.5′W.), 123 feet above the water, is shown from a white conical tower with attached dwelling on the N end of Presque Isle. The light marks the turning point for vessels bound for the Straits of Mackinac. The tower of an abandoned lighthouse is on the S end of Presque Isle.

(266) **Presque Isle Harbor,** entered between Presque Isle on the N and **North Albany Point** on the S, is a safe but limited harbor and anchorage for small craft. The entrance to the harbor is marked by a **274°** lighted range. A bar across the entrance limits the draft of vessels entering the harbor, but vessels can carry a depth of about 10 feet on the range line. Inside the bar, the harbor has central depths of 13 to 18 feet.

(267) The range should be followed closely when entering the harbor. Shoals extend N off North Albany Point, and a shoal with depths of 5 feet at its outer end extends 0.6 mile E from the S end of Presque Isle. A buoy is off the SE side of the 5-foot shoal.

(268) To anchor in Presque Isle Harbor, enter on the lighted range, and when the abandoned lighthouse on Presque Isle bears NNE, haul up a short distance N or S of the range line and anchor. In 1978, shoaling to 5 feet was reported on the range line about 1,200 feet E of the front light.

(269) **Small-craft facilities.**-A marina developed by the Michigan State Waterways Commission is on the N side of Presque Isle Harbor. The entrance to the marina is marked by private buoys

and lights. Gasoline, diesel fuel, water, electricity, sewage pump-out facilities, launching ramp and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9.

(270) **North Bay,** the indentation formed on the W side of Presque Isle, provides anchorage with shelter from E and S winds, but the bottom is rock. Enter the bay on a course of **157½°** using Presque Isle Harbor Range Rear Light, which shows across North Bay, as a guide. The bay has central depths of about 20 feet. The E shore should be given a berth of 0.3 mile and the W shore 0.25 mile. A 14-foot shoal extends from the W shore to near the middle of the bay.

(271) **Charts 14864, 14880.**–The trend of the shoreline from Presque Isle is WNW for 12 miles to **Adams Point** (45°24.9′N., 83°43.0′W.), thence W for 4.7 miles to Rogers City, and thence NW for 6.6 miles to Forty Mile Point (45°29.2′N., 83°54.8′W.).

(272) **Black Point,** 2 miles W of Presque Isle, has deep water within 0.25 mile. About 2 miles ESE of Adams Point, a detached 17-foot shoal is 1.2 miles offshore. As foul ground extends from shore to within 0.4 mile of this shoal, coasting vessels should take care to pass outside the detached shoal. From Adams Point to Forty Mile Point, deep water is generally within 0.5 mile of shore.

(273) **Calcite, Mich.,** 3.3 miles W of Adams Point, is a private harbor owned and operated by Michigan Limestone Operations for shipping limestone. The harbor is protected on the NW and N by a point and breakwater and to the SE by **Quarry Point.** The harbor affords no shelter from N to E winds except for small craft, which can enter the tug basin on an emergency only basis.

(274) **Calcite Light,** a private 8-foot-diameter neon light at the inner end of the loading slip in Calcite, is prominent.

(275) **Channels.**–A privately dredged entrance channel leads from deep water in Lake Huron SW for 0.3 mile. At the inner end of the channel, a loading slip extends SW and a dredged area along the dock face extends SE. A dredged tug basin protected by a breakwater arm is on the NW side of the entrance channel. The harbor approach is marked by a light on the outer end of the breakwater which protects the harbor; a fog signal is at the light. The channel is marked by two private lighted ranges. A **236°** range of red lights for incoming vessels marks an alinement along the S side of the channel. A range of green lights for outbound vessels leads **056°** at about midchannel. In 1978, the reported controlling depth was 25 feet in the entrance channel and loading slip. In 1972, the controlling depths were 25 and 14 feet in the S and N halves of the tug basin, respectively. The SE dock face had depths of 24 to 20 feet. Private lighted buoys mark the edge of shoal water SE of the entrance channel. Inbound vessels should keep N of these buoys.

(276) **Fluctuations of water level.**–The harbor is subject to fluctuations of water level, and vessels drawing over 17 feet should obtain information from the harbor tugs before entering the harbor. Depth information and harbor blueprints can be obtained at the dock office on the S side of the loading slip. A water gage on the SW corner of the tug basin, lighted at night, shows the maximum depth to which vessels may be loaded and should be checked by vessel masters.

(277) **Towage.**–Two tugs, LIMESTONE and DOLOMITE, are available in the harbor. Vessels turn around and are towed stern first for docking in the loading slip. The tugs monitor VHF-FM channel 16 and should be contacted before entering the harbor. When the tugs are berthed, they may be contacted through radio station WLC, Rogers City.

(278) **Wharves.**–The wharves on the N and S sides of the loading slip have lengths of 938 and 866 feet, respectively, with deck heights of 8 feet. There is open storage for over 200,000 tons of limestone. Conveyor systems can load vessels at 5,000 and 3,000 tons per hour at the N and S wharves, respectively.

(279) **Rogers City, Mich.,** is 4.6 miles W of Adams Point and 6.6 miles SE of Forty Mile Point. It is a center for the mining, processing, and transportation of limestone. The port is an open roadstead with no natural harbor, but two artificial basins provide protection for small craft. A silver water tank about 0.6 mile SW of the municipal basin is prominent.

(280) An entrance channel marked by private buoys leads SW from deep water in Lake Huron to the municipal small-craft basin, which is formed by breakwaters and entered at the SE corner. The basin entrance is marked on either side by a private light. In 1972, the controlling depth in the basin was 4 feet. On the NW side of the municipal basin, commercial fishermen use a small basin formed by breakwaters. The entrance to the basin, from NE, has depths of 3 feet and is difficult in severe storms.

(281) Rogers City is a **customs station.**

(282) Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, launching ramp, and harbormaster services are available in the municipal basin, which was developed by the Michigan State Waterways Commission. The harbormaster monitors VHF-FM channels 16 and 9.

(283) **Charts 14864, 14880, 14881.–Forty Mile Point** is a rounding projection 6.6 miles NW of Rogers City and about 29 miles ESE of Cheboygan. **Forty Mile Point Light** (45°29.2′N., 83°54.8′W.), 66 feet above the water, is shown from a square white brick tower on a dwelling on the point.

(284) **Charts 14880, 14881.**–The NW part of Lake Huron forms the approach to, and the E part of, the **Straits of Mackinac.** At its extreme NW end, the lake narrows abruptly to a width of 4 miles between **Old Mackinac Point** and **Point St. Ignace,** the narrowest part of the Straits of Mackinac. The NW end of the lake is obstructed by shoals, Reynolds Reef and Spectacle Reef near midlake and Martin Reef off the N shore, and by several islands, Bois Blanc Island the largest. The two main shipping channels through this area lead N and S of Bois Blanc Island.

(285) From Forty Mile Point, the shoreline trends W for 6 miles to the E point of Hammond Bay. A 15-foot spot is 0.7 mile offshore 1.2 miles NW of Forty Mile Point Light. Along the rest of the stretch, deep water is within 0.5 mile of shore. At the E point of Hammond Bay a 10-foot shoal extends 0.5 mile NW.

(286) **Hammond Bay,** an open bight 8.5 miles W of Forty Mile Point, provides shelter in winds from SE through S to NW. Shoals and numerous submerged net stakes extend 1 mile offshore around the bay. Fair anchorage is in the S part of the bay off the mouth of **Ocqueoc River.**

(287) Rocky ledges extend as much as 0.8 mile offshore from Hammond Bay NW for 7 miles to **Ninemile Point,** thence 6 miles WNW to Cordwood Point.

(288) **Hammond Bay Harbor** is a harbor of refuge about 3 miles NW of Hammond Bay and 4 miles SE of Ninemile Point. The harbor, formed by two detached breakwaters, is entered through a dredged entrance channel from the NW. In June 1997, the controlling depth was 10 feet in the entrance channel, thence 9 to 10 feet in the basin except for lesser depths in the W corner. A mooring area maintained by the State of Michigan on the S side of the basin had a controlling depth of 9 feet in September 1994, except for shoaling in the SW corner.

(289) Transient berths, gasoline, water, electricity, sewage pump-out facilities, a launching ramp, and harbormaster services

are available. The harbormaster monitors VHF-FM channels 16 and 9. No other services are available because of the isolated location of the harbor.

(290) At **Cordwood Point** (45°39.8′N., 84°20.0′W.), a lighted buoy marks the outer end of a reef with depths of 20 to 24 feet that extends 1.8 miles NE. During stormy weather with heavy seas, the reef is a danger to vessels transiting South Channel of the Straits of Mackinac.

(291) The **Straits of Mackinac, South Channel** passes between the lower peninsula mainland shore and the S side of Bois Blanc Island. The E entrance is between Cordwood Point and Poe Reef, which is the SE extremity of a shoal area off the SE shore of Bois Blanc Island.

(292) South Channel is a **regulated navigation area.** (See **33 CFR 165.1 through 165.13, and 165.901 (a) and (c),** chapter 2, for limits and regulations.)

(293) Between Cordwood Point and **Cheboygan Point,** 4.5 miles W, the shore is low except that a high bluff is within 1 mile of the shoreline in the E part of the reach. A lighted mast on the bluff, 1.2 miles SW of Cordwood Point, is prominent. The shoreline in this reach should be given a berth of 1 mile. A shoal with a depth of 13 feet at its outer end extends 0.8 mile NE from Cheyboygan Point.

(294) **Duncan Bay** indents the shoreline between Cheboygan Point and the mouth of the Cheboygan River, 2 miles SW. Shoals extend 0.6 mile off around Cheboygan Point and on the E side of Duncan Bay, leaving a narrow navigable channel leading SE from South Channel into Duncan Bay. Pilings from former lumber docks project from shore into the W side of Duncan Bay.

(295) Several shoals border the S side of South Channel in the approach to the Cheboygan River. **Fourteen Foot Shoal** is a hard gravel ledge with depths of 15 to 20 feet 0.9 mile NW of Cheboygan Point. **Fourteen Foot Shoal Light** (45°40.8′N., 84°26.1′W.), 51 feet above the water, is shown from a white conical tower on a square structure in the center of the shoal; a fog signal is at the light. Because of protective riprap, the light structure should not be passed close aboard even by shallow-draft vessels. A buoy is on the NW edge of the shoal. A shoal with a depth of 19 feet at its outer end extends 2.2 miles N from the mouth of Cheboygan River and is marked by a buoy 1.9 miles NW of Cheboygan Point. The shoal has depths of 22 to 30 feet that extend 1.5 miles NW from the buoy and 1.5 miles offshore.

(296) Aside from the above shoals, the shoreline is clear from the Cheboygan River NW for 15 miles to Mackinaw City, with deep water no more than 0.7 mile offshore.

(297) **Poe Reef,** with a least depth of 8 feet, is a detached shoal on the N side of South Channel, 2.7 miles SE of Bois Blanc Island with shoals between. **Poe Reef Light** (45°41.7′N., 84°21.7′W.), 71 feet above the water, is shown from a white and black horizontally banded square tower on a concrete crib on Poe Reef. A fog signal and racon are at the light. Because of protective riprap, the light structure should not be passed close aboard even by shallow-draft vessels. A buoy marks the S side of Poe Reef.

(298) **Bois Blanc Island,** forming the N side of South Channel, is a wooded island 11.5 miles long with a maximum width of 6 miles. Shoal water with depths of about 7 to 24 feet extends from the SE side of the island almost to Poe Reef. Shoals extend about 0.7 mile off the S side of the island. A 15-foot spot is 0.7 mile SSW of **Packard Point** (45°43.3′N., 84°25.2′W.). A Michigan State Waterways Commission facility is behind a breakwater on the S side of the island midway between Packard Point and **Pointe aux Pins.** The outer end of the breakwater is marked by a private light. Water and electricity are available.

(299) **Zela Shoal,** with depths of 6 feet near its outer end and rocks awash near its midpoint, extends about 2 miles WNW from **Zela Point,** on the SW side of Bois Blanc Island 3 miles NW of Pointe aux Pins. The outer end of the shoal is marked by a buoy. The remainder of the SW shore of Bois Blanc Island between Pointe aux Pins and **Lime Kiln Point** has deep water within 0.4 mile.

(300) Because of the shoals off Cordwood Point and Cheboygan Point, the recommended course through South Channel is from a point 0.6 mile NNE of the lighted buoy marking the shoals off Cordwood Point **270°** to a point 2,200 feet S of Poe Reef Light, thence **281°** to the lighted midchannel buoy 1.9 miles SSE of Pointe aux Pins, leaving the buoy to port, thence **302°** to the turning point 0.5 mile E of the center of the main towers of Mackinac Bridge, with Old Mackinac Point abandoned lighthouse bearing **198°**.

(301) **Charts 14880, 14881, 14886.–Cheboygan Harbor,** serving the city of **Cheboygan, Mich.,** is 2.5 miles SW of Cheboygan Point in the lower part of the **Cheboygan River.** The harbor is a base for commercial fishermen and pleasure craft. The principal commodities handled in the port are petroleum products and coal.

(302) **Prominent features.**–Three tanks and a stack in Cheboygan are prominent.

(303) **Channels.**–The harbor is entered through a dredged entrance channel extending SW from deep water in the Straits of Mackinac South Channel to the mouth of Cheboygan River and thence upstream for about 1.6 miles. The entrance channel is marked by a lighted buoy, a light, and a **212°30′** lighted range. A turning basin is on the SE side of the channel just inside the mouth of the river. In July 1998, the controlling depth was 11 feet (21 feet at midchannel) in the entrance channel to the turning basin, thence depths of 18 to 21 feet were in the basin, thence the controlling depth was 15 feet to the State Street Bridge, thence depths of 13 feet at the bridge decreasing to 4 feet at the lock at the head of the project. The channels are subject to shoaling.

(304) **Fluctuations of water level.**–The annual fluctuation of the water level of the Cheboygan River is about 3 feet. Day-to-day level changes due to wind and barometric pressure sometimes are 1 foot or more. Occasionally a considerable oscillation may take place within 1 or 2 hours, amounting to 1½ feet or more.

(305) **Harbor Regulations.**–The city of Cheboygan has established harbor regulations, which the **harbormaster** enforces. Copies of the regulations may be obtained from the City Manager. A **slow-no wake speed** is enforced.

(306) **Wharves.**–Cheboygan has four deep-draft facilities. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

(307) **Northwood Oil Co. Dock:** W side of the river 0.65 mile above the mouth; 400-foot face; 21 feet alongside; deck height, 3 feet; pipelines extend to tank storage, capacity 33,500 barrels; receipt of gasoline and fuel oil; owned by G.E.F.S. Marine Terminal and operated by Northwood Oil Co.

(308) **G.E.F.S. Marine Terminal:** W side of the river immediately above Northwood Oil Co. Dock; two 300-foot sections; 21 feet alongside; deck height, 3 feet; open storage for 40,000 tons of coal; receipt of coal; owned and operated by G.E.F.S. Marine Terminal.

(309) **Amoco Oil Co. Wharf:** E side of the river 0.65 mile above the mouth; 290 feet of berthing space along dolphins; 21 feet alongside; deck height, 7½ feet; pipelines extend to tank storage, capacity 171,000 barrels; receipt of gasoline and fuel oil;

owned and operated by Amoco Oil Co., Division of Standard Oil Co.

(310) **Aggregates Dock:** E side of the river above Amoco Oil Co. Wharf; deep-draft vessels lay in dredged channel and discharge by boom; 160,000 square feet open storage; receipt of aggregates; operated by various concerns.

(311) **Small-craft facilities.**–The city of Cheboygan and the Michigan State Waterways Commission provide berthing space for small craft on the W side of the river just above the State Street bridge. A marina is just upstream and just below the bridge. Berths, gasoline, diesel fuel, water, electricity, sewage pump-out, marine supplies, launch ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. A 25-ton fixed hoist is available for hull and engine repairs.

(312) **Ferry.**–A U.S. Mail boat and ferry operates from the W side of Cheboygan River above the State Street bridge to the breakwater on the S side of Bois Blanc Island. The ferry operates from about April to December depending on ice conditions. The ferry carries passengers and cargo, and autos on a reservation only basis.

(313) **Lock.**–At the upper end of the dredged channel, a lock connects Cheboygan Harbor and the Inland Route. The lock is 75 feet long and 18 feet wide with a lift of about 13½ feet. The depth over the lower miter sill is about 5 feet at Lake Huron stage of Low Water Datum, and the depth over the upper miter sill is about 8½ feet when the upper pool is level with the crest of the dam. The Michigan State Waterways Commission operates the lock and prescribes regulations and fees governing the use of the lock. The Waterways Commission maintains a small dock, about 50 feet long with a least depth of 5 feet alongside, immediately downstream of the lock entrance.

(314) Boaters proceeding upstream to use the lock are cautioned to anticipate water discharged at right angles to the stream at the powerhouse adjacent to the Charmin Paper Company. This current commences just after a bend in the river channel to the SE and is sufficient to force a boat proceeding at reduced speed into the opposite bank.

(315) **Michigan State Waterways Commission Cheboygan River Navigation Lock Regulations.**–1. When approaching the lock for passage, either upbound or downbound, boatmen shall signal the lock operator with one long and two short blasts of the vessel's horn, siren, or whistle.

(316) 2. Vessels shall not approach closer than 50 feet of the lock structure before signaling the lock operator and, upon signaling, shall maintain that distance until advised otherwise by the lock operator.

(317) 3. All tolls must be settled before passing the lock. The toll shall be assessed upon the length of the vessel as indicated on satisfactorily documented evidence produced by the vessel owner or captain.

(318) 4. All persons using or navigating the lock or canal will be held responsible for any damages they may cause to either, or to the works or structures at the entrance to the canal.

(319) 5. No boat, float, watercraft, vessel, or material of any kind will be allowed to be moored or to remain in the lock or canal, or to obstruct the entrance to either, without the permission of the Commission or for a longer time than may be allowed by it or its agents; and in case of any violation of this regulation, the Commission may, at its option, remove such obstruction and charge the owner with the expense of the removal and care thereof, which must be fully paid or settled before such boat, watercraft, or material shall be permitted to pass the lock.

(320) **Operation Schedule.**–1. From April 15, to and including Memorial Day, and from September 15, to and including October 31, the lock will be operated only between the hours of 9 a.m. and 5 p.m. on application at the Department of Natural Resources office located at 120 A Street, Cheboygan, MI; telephone, 616-627-9011 or 9841.

(321) 2. From the day after Memorial Day to and including June 14, and from the first Monday following Labor Day, to and including September 14, the lock will be operated only between the hours of 9 a.m. and 5 p.m. on application to the lock operator.

(322) 3. From June 15, to and including the first Sunday following Labor Day, the lock will be operated only between the hours of 9 a.m. and 9 p.m. on application to the lock operator.

(323) **Chart 14886.–Inland Route** is a series of connecting waters, comprising the Cheboygan River, Mullett Lake, Indian River, Burt Lake, Crooked River, and Crooked Lake, in all, about 36 miles long. The waterway extends from Cheboygan to Conway, Mich., about 2 miles inland from the head of Little Traverse Bay in Lake Michigan. The waterway also includes Pickerel Lake, which is connected by a short channel to to Crooked Lake.

(324) The **Cheboygan River** is the outlet of Mullett Lake and other waters of the Inland Route, navigable by tugs, launches, and flat scows. **Cheboygan River Lock** separates the upper part of the river from the lower harbor. Above the lock, the Cheboygan River is generally wide and deep for 2.8 miles to its junction with the Black River. Above this junction, the river outside the channel is foul with stumps and snags for the remaining 2.5 miles to Mullett Lake. The channel above the junction is marked by daybeacons. In December 1993, the controlling depth was 3 feet from the mouth of the river to Mullett Lake, but greater depths were available with local knowledge. The channel S of the river's confluence with Mullett Lake to natural deeper water in Mullett Lake had depths of 3 feet in the E half and 4 feet in the W half.

(325) A **slow-no wake speed** is enforced on the Cheboygan River.

(326) The **Black River** extends SE from its junction with Cheboygan River for about 10 miles to **Black Lake.** The river is wide and deep for its lower 2.5 miles. Above this point, the foul ground along shore widens, and even shallow draft boats must use care to traverse the remaining 2.8 miles to **Alverno Dam.** A marine railway, maintained by the Consumers Power Co., provides access to the pool above the dam. The waters above the pool are uncharted, and rapids in the river make navigation hazardous.

(327) **Chart Datum, Inland Route.**–Depths and vertical clearances under overhead cables and bridges are referred to Low Water Datum (LWD), which for Lake Huron is 175.8 feet (176.0 meters); for Mullet Lake is 592.5 feet (180.6 meters); for Burt Lake is 593.8 feet (181.0 meters); for Pickeral and Crooked Lakes is 595.4 feet (181.5 meters); for Lake Michigan is 577.5 feet (176.0 feet) and for the connecting rivers, it is the sloping surface of the river when the adjoining lakes are at LWD. All elevations are above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

(328) A **slow-no wake speed** is enforced on the Black River.

(329) **Mullett Lake,** drained at its N end by the Cheboygan River, is about 10 miles long and 3 miles wide. The lake is generally deep, with depths over 100 feet in the S central part. The entrance to the Cheboygan River at the N end of the lake is marked by a buoy and a light. A detached 4-foot shoal marked by a lighted buoy is about 1.7 miles SSW of the Cheboygan River entrance. A 2-foot shoal extends 0.6 mile off the W shore of the

## Structures across the Inland Route
### *Miles above Lake Huron
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Cheboygan River** | | | | | | | |
| 1 | State St. (U.S. Route 23) bridge | Highway | 0.92 | | | 60 | 9 | Bascule. Note 1. |
| 2 | Overhead cable | Power | 1.39 | | | | 47 | |
| 3 | Overhead cable | Power | 1.59 | | | | 44 | |
| | Cheboygan River Lock | | 1.64 | | | | | |
| 4 | Overhead cables | | 1.65 | | | | 38 | Across the lock. |
| 5 | Overhead cable | Power | 1.74 | | | | 37 | |
| 6 | Overhead cable | | 1.93 | | | | 26 | |
| 7 | Lincoln Ave. bridge | Highway | 1.93 | | | 56 | 17 | Fixed. |
| 7A | Overhead cable | | 1.93 | | | | 26 | |
| 8 | Overhead cable | | 3.60 | | | | | Data not available. |
| 9 | Overhead cable | Power | 3.64 | | | | 40 | |
| 10 | Route 33 bridge | Highway | 5.25 | | | 58 | 16 | Fixed. |
| 11 | Overhead cable | | 5.25 | | | | 20 | |
| 12 | Overhead cable | Power | 5.26 | | | | 31 | |
| 13 | Overhead cable | Telephone | 5.27 | | | | 25 | |
| 14 | Detroit and Mackinac Ry. bridge | Railroad | 5.33 | | | 110 | 21 | Fixed. |
| 15 | Overhead cable | Power | 6.11 | | | | 40 | |
| 16 | Overhead cables | | 6.24 | | | | | Data not available. |
| 17 | Overhead cable | Power | 6.71 | | | | 38 | |
| | **Indian River** | | | | | | | |
| 18 | Route I—75 bridge | Highway | 19.67 | | | 53 | 15 | Fixed. |
| 19 | Overhead cable | | 20.01 | | | | 40 | |
| 20 | ConRail bridge | Railroad | 20.52 | | | 79 | 17 | Fixed. |
| 21 | Route 27 bridge | Highway | 20.53 | | | 84 | 15 | Fixed. |
| | **Crooked River** | | | | | | | |
| 22 | Overhead cables | Power & Telephone | 29.93 | | | | 41 | |
| 23 | Route 68 bridge | Highway | 32.75 | | | 64 | 18 | Fixed. |
| 24 | Overhead cable | | 32.77 | | | | 20 | |
| 25 | Alanson bridge | Highway | 32.99 | | | 21 | 5 | Swing. Note 2. |
| | Crooked River Lock | | 33.36 | | | | | |

Note 1.—See **33 CFR 117.1 through 117.59 and 117.627**, chapter 2, for drawbridge regulations.
Note 2.—See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.

lake at the S end. A small-craft basin protected by jetties is at Aloha State Park on the E side of the lake. The outer ends of the jetties are marked by private lights.

(330) **Indian River** flows NE from Burt Lake and empties into the S end of Mullett Lake. The lower 2 miles of the river is about 0.7 mile wide, but is filled with marsh, stumps, and snags. The upper part of the river is narrow and curving. A narrow winding dredged channel, well marked by daybeacons, leads through the river. A lighted buoy marks the entrance from Mullett Lake. Parallel jetties protect the Burt Lake entrance; a light marks the outer end of the N jetty.

(331) In Indian River, operation of vessels at high speed or towing water skis or similar contrivances is prohibited between daybeacons 25 and 40 and between daybeacons 57 and 63. A **slow-no wake speed** is enforced between daybeacons 40 and 57 and between daybeacon 63 and the head of the river.

(332) **Burt Lake** is about 10 miles long N and S and has a maximum width near its center of 4 miles. It has depths up to 50 feet and no detached shoals. The mouth of the Crooked River, marked by a light, is near the center of its W side.

(333) The **Crooked River** extends SW from Burt Lake for about 5 miles through marshy ground to the NE end of Crooked Lake. The channel through the lower part of the river is marked by daybeacons. **Alanson, Mich.,** is on the river about 0.7 mile below Crooked Lake. The Crooked Lake entrance to the river is marked by a light.

(334) **Crooked River Lock,** 0.3 mile below Crooked Lake, is usable by vessels to 60 feet long and 16 feet wide. The vertical

clearance through the lock is 15 feet when the upper pool (Mullet Lake) is at Low Water Datum. The depth over the sill is 6 feet when the lower pool (Lake Huron) is at Low Water Datum. (See **33 CFR 207.476,** chapter 2, for lock regulations.)

(335) **Crooked Lake,** roughly triangular, is 4 miles long and about 2 miles wide at its center. **Oden Island,** just E of the center, extends almost across the lake leaving a narrow channel along its N side. The channel through Crooked Lake is marked by buoys and daybeacons. The village of **Oden, Mich.,** is on the N shore of the lake, NW of Oden Island.

(336) **Overland Trailer Service.**–Completing the inland route between Lake Huron and Lake Michigan, a portage service is available at the Windjammer Marina about 1 mile W of the village of Oden. Transportation in either direction can be arranged for trailerable craft to 25 feet long and less than 5,000 pounds gross weight between Crooked Lake and Little Traverse Bay on Lake Michigan, a distance of about 8 miles. An advance notice of 24 hours is requested. Information on fees and reservations may be obtained by telephone or by writing to: Windjammer Marina, Inc., Oden, Mich. 49764; telephone, 616–347–3918.

(337) **Conway, Mich.,** a small community at the W end of Crooked Lake, is the limit of navigation through the Inland Route. There is no navigable water for any type of small craft between Conway and Little Traverse Bay. **Pickerel Channel** leads from the SE side of Crooked Lake for about 0.5 mile to **Pickerel Lake.** The entrance to the channel is marked by a light.

(338) **Channels.**–In December 1993, the controlling depths in the Inland Route were 3 feet in Indian River between Mullett Lake and Burt Lake (greater depths may be available with local knowledge); thence in November 1998, 2½ feet in Crooked River from Burt Lake to Alanson, thence in 1976, ½ foot from Alanson to Crooked Lake. In 1972, the controlling depth in Pickerel Channel was 3 feet.

(339) **Small-craft facilities.**–There are marinas on the upper Cheboygan River, near the N end of Mullett Lake, on the Indian River, on Burt Lake, at Alanson, and near Oden on the N shore of Crooked Lake. Most small-craft facilities are available at these marinas.

(340) **Charts 14880, 14881.–Mackinaw City, Mich.,** is a village and railroad terminus on **Old Mackinac Point,** the northernmost point of the lower peninsula of Michigan. A water tank, a radio tower, and the abandoned lighthouse on Old Mackinac Point are prominent.

(341) **Channels.**–A harbor basin on the E side of Old Mackinac Point is enclosed by a railroad pier with a breakwater extending N from its outer end and by a combination breakwater and dock extending from shore on the N side of the railroad pier. A light on either side marks the entrance to the basin from N. A private fog signal is at the outer end of the railroad pier. In July 1998, the controlling depth was 9 feet.

(342) **Dangers.**–The submerged ruins of piers are 1,200 feet N and 200 feet S of the railroad pier. Each of the ruins extends 600 feet from shore.

(343) **Wharves.**–Passenger ferries operate to Mackinac Island from the State Dock and from a private dock, 800 and 2,700 feet S of the railroad pier, respectively.

(344) **Small-craft facilities.**–A marina developed by the Michigan State Waterways Commission and a private marina are in the harbor basin. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, launching ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. The private marina has a 12-ton hoist for hull and engine repairs.

(345) The **Straits of Mackinac** connect Lake Huron and Lake Michigan. From the N side of Bois Blanc Island, the straits lead W through Round Island Passage between Round Island and Mackinac Island, thence between Old Mackinac Point on the lower peninsula and Point St. Ignace on the upper peninsula to Lake Michigan.

(346) **Spectacle Reef,** with a least depth of 5 feet, is in the approach to the Straits of Mackinac, 10.5 miles E of Bois Blanc Island. **Spectacle Reef Light** (45°46.4′N., 84°08.2′W.), 86 feet above the water, is shown from a gray conical tower on a square concrete pier on the NW side of the shoal.

(347) **Raynolds Reef,** with a least depth of 11 feet, is 6 miles E of Bois Blanc Island. A buoy marks each end of the reef, 1.5 miles long E and W.

(348) From **Lafayette Point**, the NE point of Bois Blanc Island, the N shore of the island is generally deep-to for 7.5 miles to **Point Detachee. Lighthouse Point** juts about 2 miles N from midlength of this reach. A shoal with depths of 11 to 19 feet extends 0.6 mile NW from the point. **Bois Blanc Light** (45°48.6′N., 84°25.3′W.), 32 feet above the water, is shown from a white cylindrical tower on Lighthouse Point. The light is obscured from **311°** to **101°**. From Point Detachee to the W end of Bois Blanc Island, the shoal border increases to a width of about 1 mile.

(349) **Round Island,** small and hilly, is just off the NW end of Bois Blanc Island, separated from it by very shallow water with submerged rocks. Buoys on the S side of Round Island Passage mark shoal water extending N from Round Island. **Old Round Island Point Light** (45°50.2′N., 84°37.0′W.), 53 feet above the water, shown from a red and white conical tower, is privately maintained and is on the NW tip of the island.

(350) **Round Island Passage,** the dredged channel between Round Island and Mackinac Island, had a controlling depth of 28 feet in July 1978. The S edge of the channel is marked by two lighted buoys. The N side of the passage is marked by a lighted bell buoy off the SE end of Mackinac Island and by Round Island Passage Light. **Round Island Passage Light** (45°50.6′N., 84°36.9′W.), 71 feet above the water, is shown from a white skeleton tower on an octagonal white structure on a red square house on a white base on the N side of the passage about 150 feet outside the channel limit. A fog signal and racon are at the light.

(351) **Mackinac Island,** 0.6 mile NW of Round Island, is about 3 miles long and 1.8 miles wide. The island is very bold, and its shores are generally rocky and deep-to. A lighted bell buoy marks the extent of shoals off the SE corner of the island. A detached shoal with a least depth of 15 feet is 1.4 miles off the E shore of the island, at about its midlength.

(352) A **regulated navigation area** is between the W side of Mackinac Island and the mainland. (See **33 CFR 165.1 through 165.13, and 165.901 (a) and (c),** chapter 2, for limits and regulations.)

(353) **Mackinac Island, Mich.,** is a resort village and small-craft harbor on the shores of the semicircular bay at the SE end of Mackinac Island. The bay opens toward the SE between **Biddle Point** on the W and **Mission Point** on the E. A water tank and hotel cupola NW of the harbor entrance and a church spire N of the harbor entrance are prominent. The harbor is partially protected by a breakwater extending S from Mission Point and by a detached breakwater extending SE from off Biddle Point. The outer ends of the breakwaters are marked by lights. While also protected by Mackinac Island and Round Island from N and S

winds, respectively, the harbor is subjected to heavy seas through the Straits when the wind is E or W.

(354) On the NW side of the harbor, Union Terminal Piers, Inc. operates a 700-foot passenger pier and a 400-foot coal pier, each marked at the outer end by a private light. In 1969, depths at the outer end of the piers were 13 and 11 feet, respectively.

(355) **Ferries.**–Passenger ferries operate between Mackinac Island and Mackinaw City from May to October and between Mackinac Island and St. Ignace from April to December, ice conditions permitting.

(356) **Small-craft facilities.**–Transient berths, gasoline, diesel fuel, electricity, sewage pump-out, and harbormaster services are available at the Michigan State Waterways Commission pier on the N side of the harbor. The harbormaster monitors VHF-FM channels 16 and 9.In 1978, depths of 6 to 14 feet were reported alongside. Gasoline is available at the coal dock.

(357) **Majors Shoal,** a dangerous rocky ledge with a least depth of 10 feet, is 2.4 miles WSW of Round Island. The ledge, 0.7 mile long E and W, is marked by a buoy and a lighted buoy on the E and W ends, respectively. The ledge is on the S side of the vessel passage between Round Island Passage and Mackinac Bridge.

(358) A wreck, covered 32 feet is 2.1 miles S of Majors Shoal, close S of the vessel route through Straits of Mackinac South Channel.

(359) **Graham Point** (45°51.0′N., 84°42.2′W.) is the SE extremity of Point St. Ignace on the N side of the Straits of Mackinac. In 1971, submerged dock ruins were reported 210 feet off the S shore of Graham Point. **South Graham Shoal,** with a least depth of 2 feet, and **North Graham Shoal,** with a least depth of 4 feet, are 1.5 miles S and 1 mile SE of the point, respectively. South Graham Shoal is marked on the S side by a buoy and North Graham Shoal is marked on the E side by a lighted bell buoy. Depths between the two shoals are 15 to 20 feet, and there is a channel with a least depth of 19 feet between the shoals and Graham Point. Currents in the vicinity of the Graham Shoals and the Straits of Mackinac are often strong and irregular.

(360) **Mackinac Bridge** spans the Straits of Mackinac between Old Mackinac Point and Graham Point. The center suspension span of the bridge has a clearance of 148 feet at the center decreasing to 135 feet at each end. The main navigation channel through this span is marked by lighted buoys. (The bridge is more fully described in chapter 11, Lake Michigan.)

(361) **St. Ignace, Mich.,** is a resort community and ferry terminal in **East Moran Bay** on the N side of Graham Point.

(362) **St. Ignace Coast Guard Station** is on the E side of Graham Point. The Coast Guard station is marked by a light.

(363) **Wharves.**–On the E side of Graham Point, the State of Michigan has constructed two 460-foot docks. The slips on the N side of the S dock and on the S side of the N dock have been dredged to 22 feet and 27 feet, respectively. The slip on the outside of each dock has been dredged to 20 feet. In 1980, the docks were being used for the docking of Coast Guard vessels.

(364) **Ferries.**–Several ferry companies operate from St. Ignace. Several docks in East Moran Bay have passenger ferries to Mackinac Island.

(365) **Small-craft facilities.**–At the State Dock, 850 feet N of the Mackinaw Transportation Co. dock, a small-craft basin developed by the Michigan State Waterways Commission and protected by a breakwater extension provides gasoline, water, electricity, sewage pump-out, launching ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. The basin is marked by a private light on the outer end of the breakwater and by private buoys. In 1978, depths of 6 feet were reported alongside the berths.

(366) **Rabbit Back Peak** is a bold headland jutting E about 4.5 miles N of Graham Point. Shoals with submerged rocks extend 0.5 mile SE from the point. The bight on the S side of the point has shoals to 0.8 mile offshore. The bay between Rabbit Back Peak and **Grosse Point** (45°58.5′N., 84°41.2′W.), 4 miles N, has shoals extending 1 mile offshore in the N part. Grosse Point should be given a berth of 0.5 mile.

(367) **St. Martin Bay,** 7 miles N of Mackinac Island, is formed between Grosse Point on the W and **St. Martin Point** (45°58.1′N., 84°31.7′W.) on the E. St. Martin Island and Big St. Martin Island divide the mouth of the bay into three deep passages. The bay has depths of 24 feet to within 1 mile of shore except in the NW and NE corners where the sandy flats extend 1.5 miles offshore.

(368) **Big St. Martin Island**, 2 miles E of Grosse Point, has deep water within 0.5 mile of its shores. **St. Martin Island,** 1.5 miles E of Big St. Martin Island, has deep water within 0.3 mile of shore except on the S side where shoals with small islets and rocks, awash and submerged, extend about 1 mile S.

(369) A small islet is 0.6 mile S of St. Martin Point with shoals between and extending about 0.3 mile S and SE from the islet. **Search Bay** is between St. Martin Point and **Brulee Point,** about 3 miles E. The bay has deep water to within 1 mile of its head except for a 16-foot spot in the middle of the entrance.

(370) **Charts 14881, 14885.–Goose Island,** 3.3 miles SE of Brulee Point, is 1.3 miles long NW and SE and 1,000 feet wide or less. The island is on a very shallow bank that extends about 0.5 mile offshore around the island. The bank is covered with numerous small islets and rocks, submerged and awash. The S end of the bank is marked by a buoy. **Goose Island Shoal,** with a least depth of 2 feet, is 3 miles SW of Goose Island. The shoal is marked on the SE side by a buoy and on the W side by a lighted buoy.

(371) **Charts 14880, 14881, 14885.–Les Cheneaux Islands** are an extensive island group bordering the shore for about 15 miles E from Brulee Point. The islands and their neighboring shoals, as well as the numerous points jutting among them from the adjacent shoreline, have a characteristic trend from NW to SE. The many inlets and channels formed between the islands and points have considerable deep water, but are so obstructed by banks and detached shoals as to be navigable only by small craft.

(372) **Channels.**–A small-craft channel, marked by lighted and unlighted buoys, leads from Brulee Point on the W generally between the N side of the islands and the mainland to the E entrance through **Scammons Harbor,** about 8 miles E of Brulee Point. The channel is dredged along the N sides of **Marquette Island** and **La Salle Island,** the largest islands in the group. Another dredged channel leads through **Middle Entrance** between Marquette Island and **Little La Salle Island.** In July 1987, the controlling depth in the dredged channels was 7 feet. In 1973-1977, the controlling depth was 6 feet in Middle Entrance channel.

(373) Numerous private buoys and several private lights mark small-craft hazards, such as rocks and shoals, throughout the island group. Several private buoys also mark secondary channels used by local boatmen.

(374) **Hessel, Mich.,** is a town 3 miles NE of Brulee Point opposite the NW end of Marquette Island. A public docking facility developed by the Michigan State Waterways Commission behind a breakwater just S of the Post Office provides water, transient berths, gasoline, electricity, sewage pump-out facilities, a launch-

ing ramp and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. Marinas to the E and W provide gasoline, diesel fuel, and marine supplies. A 12-ton hoist can handle 42-foot boats for hull, engine, and minor electric repairs.

(375) **Cedarville, Mich.,** is 3.3 miles E of Hessel, opposite the N end of La Salle Island. A marina 0.8 mile S of the town provides transient berths, water, electricity, sewage pump-out, and marine supplies. A 50-ton lift can handle 60-foot boats for hull and engine repairs.

(376) **Port Dolomite, Mich.,** on the NE side of the entrance to **McKay Bay** about 4 miles E of Cedarville, is a private dock of the Michigan LimestoneOperations, Cedarville Plant. A channel privately dredged to a depth of 27 feet leads from deep water NW to the L-shaped dock at the facility. A private **309°** lighted range on the dock marks the approach. Vessels berth along the SW face of the dock. In 1969, the controlling depth alongside the dock was 29 feet. A private lighted buoy just S of the dock marks the N end of a shoal with a least depth of 14 feet.

(377) There are several dangers in the approach to Port Dolomite. **Crow Island,** 2 miles SE of Port Dolomite, is marked at the NW end by a private light. Shoals extend 0.1 mile N and 0.5 mile SE from the island. A shoal, marked off the SE side by a private lighted buoy, has a least depth of 10 feet 0.4 mile SW of Crow Island. **Surveyors Reef,** with several bare spots, is 1 mile SE of Crow Island. A private lighted buoy marks the NW end of the reef. **Tobin Reef,** with several bare spots, is marked at the NW end by a buoy 1.3 miles SE of Surveyors Reef. A 16-foot shoal is 0.6 mile W of Tobin Reef. **Pomeroy Reef,** with a least depth of 12 feet, is 0.9 mile S of Tobin Reef. A lighted gong buoy off the W end of the reef marks the turning point for vessels bound for Port Dolomite.

(378) **Charts 14880, 14881, 14882.–Martin Reef,** with a least depth of 1 foot, is about 1.5 miles E of Pomeroy Reef. It is at the E end of Les Cheneaux Islands and is the outermost danger in this stretch, lying near the vessel route between De Tour Passage and the Straits of Mackinac. **Martin Reef Light** (45°54.8′N., 84°08.9′W.), 65 feet above the water, is shown from a white square tower on a concrete crib on the SE part of the reef. A fog signal is at the light. The light should not be passed close aboard even by shallow-draft vessels, because of protective riprap.

(379) From **Beaver Tail Point** (45°58.0′N., 84°10.3′W.) E for 12.5 miles to Point De Tour, the shoreline continues irregular with numerous off-lying shoals and small islands, and should be given a berth of 1.3 miles. **Beaver Tail Reef,** with a least depth of 5 feet and submerged rocks, is 1 mile SE of Beaver Tail Point. **St. Vital Point** (45°56.9′N., 84°00.0′W.), about 8 miles E of Beaver Tail Point, forms the W side of **St. Vital Bay.** Shoals extend about 0.7 mile E from the tip of the point, and shoals extend about 1 mile SE from shore on the NE side of the bay. Between these two banks, there is deep water to within 0.5 mile of the head of the bay. A detached 15-foot shoal is 1.7 miles E of St. Vital Point.

(380) **Point De Tour** (45°57.4′N., 83°54.8′W.) is on the W side of the entrance to De Tour Passage, the entrance to St. Marys River. (The passage is described in chapter 12, St. Marys River.) A shoal with a depth of 11 feet at its outer end extends 0.6 mile SW from the point. **De Tour Reef,** with a least depth of 15 feet, extends about 0.7 mile SE from the point. **De Tour Reef Light** (45°56.9′N., 83°54.2′W.), 74 feet above the water, is shown from a white square tower on a crib on the SE end of the reef. A fog signal, radiobeacon, and a radar beacon (Racon) are at the light. The light marks the W side of the entrance to De Tour Passage.

(381) **Crab Island Shoal,** with rocks nearly awash, is 0.3 mile S of **Crab Island,** which is connected to **Barbed Point** at the W end of Drummond Island. A lighted bell buoy at the W end of the shoal marks the E side of the channel through De Tour Passage.

(382) **Charts 14880, *2251, 14882.–Drummond Island, MI,** the easternmost part of the upper peninsula of Michigan, extends from De Tour Passage 20 miles E to False Detour Channel and has a maximum width of about 12 miles N and S. The S shore of the island fronts on Lake Huron, the NE shore on North Channel, and the NW shore is indented by Potagannissing Bay.

(383) From Barbed Point N for 3 miles to **Black Rock Point** (46°00.6′N., 83°51.9′W.), the W shore of Drummond Island fronts De Tour Passage. Osborne Materials Company operates a dock for the shipment of dolomite 1.3 miles N of Barbed Point. The 800-foot dock has a deck height of 10 feet and depths of 23 feet reported alongside. A conveyor system can load vessels at 4,000 tons per hour. When approaching or leaving the dock, avoid the shoals marked by buoys N and S of the dock.

(384) **Potagannissing Bay,** a deep, wide passageway between the NW side of Drummond Island and St. Joseph Island, connects the W end of North Channel with the St. Marys River immediately N of De Tour Passage. However, the bay is obstructed by numerous islands and by many shoals which make up abruptly from deep water. A channel marked by lights and lighted and unlighted buoys leads through the NW part of the bay.

(385) Potagannissing Bay indents the NW shore of Drummond Island between **Dix Point** (46°01.5′N., 83°50.7′W.) and **Chippewa Point** (46°05.9′N., 83°43.2′W.). **Drummond, MI,** a town on the S side of the indentation 4.5 miles E of Dix Point, has a sawmill and limestone quarries. A marina at the town provides gasoline, diesel fuel, water, electricity, sewage pump-out, marine supplies, and a launching ramp. A 12-ton hoist can handle craft to 40 feet for hull and engine repairs.

(386) A **custom station** is at Drummond.

(387) The N shore of Drummond Island, from Chippewa Point to **Raynolds Point** 6.5 miles E, is deep-to. From Raynolds Point SE for 8.8 miles to Marble Head, the shore continues deep-to except in the vicinity of **Shoal Point** (46°03.5′N., 83°33.3′W.). **Humphrey Rock,** covered 9 feet, is 0.9 mile E, and **Lindsay Bank,** with a least depth of 11 feet, is 1.2 miles SE. A 21-foot spot is 1.1 miles NNE of Shoal Point. **Marble Head** (45°59.2′N., 83°28.4′W.), the highest point on Drummond Island, is on the W side of the entrance to False Detour Channel from North Channel. Two indentations on the NW side of Marble Head, **Glen Cove** and **Sitgreaves Bay,** provide protection from S and W winds with good anchorage in depths of 24 feet and more, mud and clay bottom.

(388) From Marble Head SSW for 5.5 miles, the shore of Drummond Island fronting False Detour Channel is generally deep-to. The S shore of the island is broken, with numerous indentations and many off-lying shoals and islands. The largest bays, from W to E, are Whitney Bay, Island Harbor, Huron Bay, and Big Shoal Cove. These natural harbors have depths of 24 to 40 feet, but because of numerous obstructions, they should not be entered in foggy weather or without local knowledge.

(389) **Whitney Bay,** on the E side of Barbed Point, is separated from the lake by several islands with two deep channels, marked by private buoys, leading into the bay. Outside the islands in the approach to the bay, several shoals rise abruptly from deep water. The outermost is a rock, covered 7 feet, 0.9 mile S of **Bellevue Island** and marked on the SW side by a buoy. From the buoy a shoal bank extends 0.6 mile E. A 12-foot and a 14-foot spot are

0.5 and 0.8 mile NW of the buoy, respectively. A reef with rocks awash and a reef with rocks just below the surface are 0.4 mile S and SE of Bellevue Island, respectively.

(390) A marina, about 1.2 miles N of Bellevue Island on the E side of Whitney Bay, had depths of 6 to 9 feet reported alongside in 1978. The marina provides gasoline, water, electricity, a launching ramp, a 4-ton fixed hoist, and hull and engine repairs.

(391) **Island Harbor,** 3 miles SE of Barbed Point, is separated from Whitney Bay by **Point Anderson. Espanore Island,** 0.8 mile SE of Point Anderson, encloses Island Harbor on the SW. A 1-foot reef with scattered boulders is 0.8 mile NW of the SW end of Espanore Island with a 13-foot shoal between. A rocky ledge extends 0.7 mile S from the island, and a ledge with rocks awash that extends 0.4 mile E from the island narrows the entrance to Island Harbor to about 0.25 mile.

(392) **Huron Bay,** 2.5 miles E of Island Harbor, has a deep entrance about 0.4 mile wide on the E side of **Gravel Island.** A ledge with rocks awash extends 0.7 mile S from the E side of the bay. A rocky ledge with depths of 1 to 4 feet extends 0.7 mile S from Gravel Island.

(393) From Huron Bay E for 7 miles to Big Shoal Cove, the shore is bordered by shoals extending about 0.5 mile off. **Holdridge Shoal,** a detached shoal with a least depth of 5 feet, is 2 miles SE of Gravel Island.

(394) **Scammon Cove,** just NW of Big Shoal Cove, is enclosed between **Meade Island** on the W and **Scammon Point** on the SE. **Horseshoe Reef,** awash, is 1.3 miles SW of Meade Island. A large shoal with a least depth of 8 feet is between Meade Island and Horseshoe Reef.

(395) **Big Shoal Cove,** on the E side of Scammon Point, provides good anchorage in 24 to 30 feet, clay bottom. Detached 4-foot and 6-foot shoals, 0.4 mile SE and 0.65 mile ESE of Scammon Point, respectively, are dangerous obstructions in the entrance to the cove. A rocky ledge, with some rocks uncovered, extends 1.5 miles SSW from the E side of the cove entrance. **Big Shoal,** the outer end of the ledge, expands to a width of 1.2 miles. The SW end of the ledge is marked by a buoy.

(396) From Big Shoal Cove E for 4 miles to False Detour Channel, the shore of Drummond Island should be given a berth of 1.5 miles.

(397) **Canadian Waters.**–The **International boundary** between the United States and Canada passes through False Detour Channel, around the N side of Drummond Island, MI, through North Channel, and around the S side of St. Joseph Island, Ont., into the St. Marys River.

(398) **False Detour Channel,** a deep wide passage, leads between the E end of Drummond Island, MI, and the W end of **Cockburn Island, Ont.** from Lake Huron to North Channel. A rock, covered 9 feet (2.7 meters), 0.7 statute mile (0.6 nm) SW of the SE point of Drummond Island should be avoided in approaching the passage.

(399) For a description of Cockburn Island, Manitoulin Island, North Channel, and Georgian Bay (in short, all the waters of Lake Huron E of the **International Boundary**) see **Canadian Sailing Directions-Great Lakes, Volume II**.

# 11. LAKE MICHIGAN

(1) **Chart Datum, Lake Michigan.**–Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Michigan is an elevation 577.5 feet (176.0 meters) above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

**Dimensions, etc.**

(2) Length, steamer track, Chicago to Straits of Mackinac; 321 miles.

(3) Length (right line), from about longitude 87°30′W. at the S end to 85°45′W. at the N end; 307 miles.

(4) Breadth (right line), on about latitude 45°25′N.; 118 miles.

(5) Depth, maximum recorded by NOS; 923 feet.

(6) Water surface of lake (including Green Bay); 22,300 square miles.

(7) Entire drainage basin (including Green Bay); 67,900 square miles.

(8) **General description.–Lake Michigan** is the third largest of the Great Lakes and is the only one entirely within the United States. The only natural outlet of the lake is at the N end through the Straits of Mackinac. At the S end of the lake, the Illinois Waterway provides a connection to the Mississippi River and the Gulf of Mexico. The N part of the lake has many islands and is indented by several bays; Green Bay and Grand Traverse Bay are the largest. The shores in the S part of the lake are regular, and it has been necessary to construct artificial harbors. The forested shores in the N part of the lake are sparsely populated, while those in the S part are near the heart of the great urban industrial area of the U.S. Midwest.

(9) **Fluctuations of water level.**–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, the lowest stages prevailing during the winter and the highest during the summer.

(10) In addition to the normal seasonal fluctuations, oscillations of irregular amount and duration are also produced by storms. Winds and barometric pressure changes that accompany squalls can produce fluctuations that last from a few minutes to a few hours. At other times, strong winds of sustained speed and direction can produce fluctuations that last a few hours or a day. These winds drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This effect is more pronounced in bays and at the extremities of the lake, where the impelled water is concentrated in a small space by converging shores, especially if coupled with a gradually sloping inshore bottom which even further reduces the flow of the lower return currents. This condition is very pronounced at Green Bay Harbor.

(11) **Weather, Lake Michigan.**–Rough water is created when strong winds blow over a long fetch of water. Northerly winds cause this on the S part of the lake and southerly winds have the same effect on the N part of the lake. They raise dangerous seas and generate hazardous currents at harbor entrances. Winds with southerly components are prevalent during the entire navigation season. Northerlies are a little less frequent, but are common, particularly in spring. The sea conditions are worst in October and November, when, lakewide, wave heights of 5 to 10 feet (2 to 3 m) are encountered about 35 percent of the time. In October, S through SW winds are most often responsible, while by November W through N winds often generate rough seas. Seas of 10 feet ( 3 m) or more are encountered 3 to 5 percent of the time from November through March. Extreme waves of 20 to 22 feet (6 to 7 m) have been encountered. During the spring, high seas are infrequent, but 5- to 10-foot (2 to 3 m) seas develop 15 to 30 percent of the time in the S and 20 to 40 percent in the N. Summer seas climb above 10 feet (3 m) less than 1 percent of the time, while those in the 5- to 10-foot (2 to 3 m) category drop to less than 20 percent in June and July. By August, the fall buildup begins.

(12) Gales are most likely from September through April, particularly in the fall. During this season gales blow 3 to 7 percent of the time; speeds of 28 knots or more occur from 12 to 20 percent of the time. Strong winds often blow out of the W and NW, making E shore harbor entrances dangerous. The strongest measured over-the-lake wind was out of the WSW at 58 knots. However, since Green Bay recorded a 70-knot southwesterly gust in May 1989, it is not unrealistic to expect a wind extreme of 70 knots or more over open waters. Spring winds can still blow strong, with winds of 28 knots or more encountered about 4 to 8 percent of the time. They do slacken from their winter fierceness, with southerlies and southwesterlies becoming more frequent and northerlies less so as summer approaches. Strong winds are infrequent in summer and mostly associated with thunderstorms. S and SW winds prevail particularly in the N; southeasterlies are also common in the S. Northerlies are a secondary wind.

(13) Coastal winds are more localized and variable. Along the Michigan shore, spring winds are variable, particularly in the morning, when northerlies, easterlies, and southerlies are among the most common. By afternoon, aided by a lake-breeze effect, there are a preponderance of winds out of the S, particularly with the approach of summer. Summer also brings a slackening of windspeeds. The likelihood of encountering winds of 28 knots or more falls from a 4- to 10-percent chance in March to less than 3 percent by May. The most likely cause of strong winds in spring and summer are thunderstorm gusts. By summer, windspeeds of 28 knots or more occur less than 4 percent of the time and less than 2 percent most of the time. Summer winds along the shore are usually out of the E through S during the morning hours, swinging to the S and NW by afternoon, with an increase in speed. By October, there is a noticeable increase in windspeeds. Speeds of 28 knots or more increase to 4 to 6 percent. By December, these speeds can be encountered up to 11 percent of the time. Morning directions are variable, with E, S, and W winds among the most common. Afternoon winds are most often out of the S through W. The strong winds continue throughout the winter and are associated with winter storms, which bring a variety of winds from SW through NE.

(14) Along the W shore of the lake, spring winds are variable, but the influence of the land-lake breeze is already noticeable. Morning winds often have a westerly component, while an easterly influence is evident during the afternoon. Wind strength grad-

ually abates during spring; by May, winds of 28 knots or more are encountered less than 1 percent of the time. Except for occasional thunderstorm gusts, summer winds rarely exceed 28 knots through September. Morning breezes are generally out of the S through W. During the day, they strengthen slightly and blow out of the NE through SE; SW and W winds are also common during the afternoon, when the prevailing circulation interferes with the lake-breeze effect. With autumn comes an increase in strength and less diurnal variability. By November, winds of 28 knots or more are encountered about 1 percent of the time. Fall winds blow mainly out of the S through NW, with SW and W winds the most frequent. During winter, westerlies and northwesterlies are common, but unseemingly, winds of 28 knots or more are no more frequent than in fall.

(15) While thunderstorms can occur at any time, they are most likely from May through September. During this period, thunder is heard on an average of 4 to 8 days per month at locations along the shore and 1 to 3 percent of the time over open water. Activity is a little more numerous in the S than the N. Over open water, July and August are the peak months, while June and July are more active along the shore. During the summer, a cool dome of air, the result of the lake breeze, often blocks thunderstorms and squall lines during the day. This results in a nighttime peak in activity. However, a severe squall line may break through this block, or due to a strong prevailing circulation, the block may not exist.

(16) In spring, when there is often a clash between cold and warm air, thunderstorms and squall lines can be violent. On occasion they may trigger tornadoes or even waterspouts. This area lies at the NE edge of the nation's maximum frequency belt for tornadoes. Although rare, tornadoes are most likely from April through June.

(17) Poor visibilities, caused by fog, rain, snow, and pollution, may occur in any season. Fog is the principal cause of visibilities less than 0.5 statute mile (0.4 nm). It is most likely in the spring and early summer over open water (advectionfog) and from late fall through spring along the shore (radiation fog).

(18) In open waters, from March in the S and April in the N through June, warm moist air riding winds with a southerly component blowing at 5 to 20 knots reduces visibilities to less than 0.5 statute mile (0.4 nm) from 5 to 10 percent of the time. These fogs are most likely during the morning and early afternoon and when the air is 5° to 15°F (3° to 8°C) warmer than the water. May and June are the most likely months.

(19) The shores of Lake Michigan are subject to varying amounts of fog. Upwelling along the NW shores increases the possibility of advection fog in spring and summer; in fact, the W shore waters in general are 5 to 10°F (3° to 6°C) cooler than the E shore waters. N of Chicago, visibilities drop to less than 0.5 statute mile (0.4 nm) on about 25 to 35 days annually. In the Chicago area, smoke and haze frequently reduce visibility to the 3- to 6-mile (2.6 to 5.2 nm) range, but dense fog is less common than it is to the N. It is most likely from fall through late spring with a minimum in July. Along the Michigan shore, the indication from the few locations with fog observations is that frequencies are similar to those along the Wisconsin shore. In comparing Muskegon to Milwaukee, both exhibit a morning maximum from April through October, early morning in the summer and around sunrise in other seasons. The most fog-free times occur during the afternoon in spring and late morning through evening in summer. Milwaukee is more fog prone in spring, but less in summer and fall. Overall, Muskegon averages 5 fewer days annually with visibilities less than 0.5 statute mile (0.4 nm).

(20) **Ice.**–The first waters to form an extensive ice cover are Green Bay and the Bays de Noc. The Straits of Mackinac and the shallow areas N of Beaver Island usually follow. The Straits are usually closed by mid-December. (See the discussion of ice in the Straits of Mackinac in chapter 10.) These buildups are aided by windrows resulting from prevailing winds and currents. In a normal winter, an early ice cover is established by the end of January and includes the above-mentioned waters plus the extreme S part of the lake. In general, ice accumulates in a southerly direction with a rapid buildup in the shallows E of Manitou and Fox Islands. In this area, the prevailing NW wind traps ice between the land masses and, with the exception of Grand and Little Traverse Bays which are solid, vessels can expect to encounter drifting ice. The surface features and location of the ice fields change as a direct function of the wind. Shores exposed to the full force of the wind often have large ice fields of very heavy brash extending 1 to 2 miles offshore. In addition, a circular current pattern in the S part of the lake distributes drifting floes along the shore. Even during a mild winter, these floes can build out 10 to 15 miles into the lake. A mild winter on Lake Michigan means about 10-percent coverage compared to an average 40-percent coverage and an 80-percent coverage during a severe winter. Maximum ice coverage occurs by mid-March, on the average, while decay begins a week or two later. By mid-April, ships are once again transiting the Straits of Mackinac.

(21) **Routes.**–The Lake Carriers' Association and the Canadian Shipowners Association have recommended, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Michigan:

(22) Southbound vessels, bound for Milwaukee and W shore points N thereof shall run out on a course of **241°** for 30 miles from a point of departure abreast of Lansing Shoals on course to Rock Island Passage then steer **205°** for 202.5 miles to Milwaukee, or other courses to destination.

(23) Southbound vessels, bound for W shore points S of Milwaukee shall run out on a course of **241°** for 30 miles from a point of departure abreast of Lansing Shoals on course to Rock Island Passage; then steer **196°** for 208 miles to a point E of Wind Point to intersect the regular southbound track; vessels bound for Calumet or Indiana Harbor steer **188°** for 69.5 miles; vessels bound for Buffington or Gary steer **183°** for 73.6 miles; vessels bound for Burns Harbor change course 19.7 miles prior to reaching the point E of Wind Point and steer **180°** for 96.75 miles.

(24) Southbound vessels from Sturgeon Bay bound for ports near the S end of Lake Michigan shall lay a course of **172°** for 47.5 miles to a point 19 miles **114.75°** from Rawley Point Light.

(25) Southbound vessels from Porte Des Morts Passage bound for the S end of Lake Michigan shall lay a course of **189°** for 79.5 miles to a point 19 miles **114.75°** from **Rawley Point Light**.

(26) From the point 19 miles E of Rawley Point Light vessels shall steer **183°** for 165.25 miles to Buffington or Gary, or when **090°** from **Wind Point Light** vessels can change course to **188°** for 69.5 miles to Calumet or Indiana Harbor.

(27) Southbound vessels from the Straits of Mackinac bound for E shore points may use the Grays Reef Passage or the northbound course by Lansing Shoals. If they choose to use the Grays Reef Passage they shall lay a course from the Mackinac Bridge, steering **275°** until abeam of **New Shoal Lighted Buoy 1** when change is made to **260°**. Steer **260°** until turning to the **186°** course through Grays Reef with White Shoal bearing **006°**.

(28) From Grays Reef, take departure from Grays Reef Passage steering **237°** and haul to **217°** when abeam **Ile Aux Galets Light**. Then when abeam Leland Light, change course to **197°** until

abeam **North Manitou Shoals Light** when haul is made to **242°** for about 13.25 miles for Sleeping Bear.

(29) When abeam **Sleeping Bear Lighted Bell Buoy 7**, steer **205°** for 17.5 miles to a point 3.75 miles W of Point Betsie Light; then steer **195°** for 45.25 miles to a point 3 miles W of **Big Sable Light**; then steer **183°** for 28 miles to a point 3 miles W of Little Sable Light; thence to destination.

(30) Northbound vessels for the Straits of Mackinac will navigate via Manitou Passage. This rule does not apply to vessels coming out of Green Bay. Vessels from Southern Lake Michigan set a course for a point 4.75 miles abreast of Big Sable. These courses and distances are: from Burns Harbor **009°** for 169.5 miles; from Gary and Buffington **012°** for 168 miles; from Calumet and Indiana Harbor **015°** for 163.75 miles, and from Chicago **017°** for 158 miles; then, from abreast Big Sable, steer **015°** for 44 miles until 5.75 miles from **Point Betsie Light**; then steer **029°** for 17.5 miles until abreast of Sleeping Bear Lighted Bell Buoy 7; then steer **062°** for 14.5 miles until abreast of **North Manitou Shoal Light**; then **037°** for 64.75 miles to Grays Reef.

(31) Vessels eastbound out of St. Martin and Rock Island Passages shall set a course to pass not more than 6 miles off Seul Choix Point. Taking departure from **Rock Island Passage Lighted Gong Buoy RI** the course is **056°** for 58 miles.

(32) Vessels northbound from ports near the S end of Lake Michigan to Escanaba shall set course for not more than 8 miles off Wind Point. Vessels from Gary and Buffington steer **350°** for 75.75 miles; vessels from Calumet and Indiana Harbor steer **354°** for 69 miles. Then steer **006°** for 98.75 miles to a point not more than 5 miles off Rawley Point; then steer **020°** for 75.25 miles to Porte Des Morts Entrance Lighted Bell Buoy. Northbound vessels to Port Inland from near the S end of Lake Michigan shall follow the northbound Manitou course to a point 5.75 miles abreast Point Betsie; then steer **013°** for 63.5 miles to a point 4 miles W of Boulder Reef; then steer **022°** for 23.75 miles to **Port Inland Lighted Bell Buoy 2**; then steer **000°** 4 miles to destination.

(33) It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on charts No. 14900 and 14901, Lake Michigan.

(34) **Pilotage.**–The waters of Lake Michigan are Great Lakes undesignated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters. Registered pilots for Lake Michigan are supplied by Western Great Lakes Pilots Association (See appendix for addresses.) Pilot exchange points are off Port Huron at the head of St. Clair River in about 43°05′30″N., 82°24′42″W. and at De Tour, Mich., at the entrance to St. Marys River. Three pilot boats are at Port Huron; HURON BELLE has an international orange hull with an aluminum cabin, and HURON MAID and HURON LADY each have an international orange hull with a white cabin. The pilot boat at De Tour, LINDA JEAN, has a green hull and a white cabin. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

(35) **Principal ports.**–Most of the harbors on the E side of Lake Michigan are within the mouths of small rivers or in small lakes connected to Lake Michigan by an entrance channel. Parallel piers have been constructed at the mouths of these harbors to aid in carrying the bar into deeper water and to lessen the need for dredging in the harbor entrance. In addition, several harbors along this shore have been provided with stilling basins formed by breakwaters that converge to an entrance opening in deep water beyond the parallel piers. These basins dissipate the force of storm generated waves to prevent them from being conducted through the confined channels between the piers and into the harbors.

(36) The harbors on the W side of the lake are generally at the mouths of small rivers, the only large streams being the Fox and Menominee Rivers which empty into Green Bay. The entrances to the harbors are generally protected by parallel piers, and some have been provided with stilling basins. Some harbor entrances are protected by detached breakwaters. Outer harbors enclosed by breakwaters have been constructed at Calumet Harbor and Milwaukee. Entirely artificial harbors, with basins enclosed by piers and breakwaters, are at Burns International Harbor, Gary, Buffington, Indiana Harbor, Great Lakes, Waukegan, Port Washington, and Port Inland.

(37) The most important harbors in Lake Michigan are Muskegon, Calumet, Chicago, Milwaukee, Kenosha, and Green Bay. Drydocking facilities for deep-draft vessels are at Sturgeon Bay.

(38) **Charts 14880, 14881, 14902.–Old Mackinac Point** (45°47.3′N., 84°43.8′W.), the northeasternmost point of the lower peninsula of the State of Michigan, is on the S side of the narrowest part of the Straits of Mackinac at the entrance to Lake Michigan. The point is marked by an abandoned lighthouse.

(39) **Mackinaw City, Mich.,** is a village and railroad terminus on Old Mackinac Point. A water tank, a radio tower, and the abandoned lighthouse on Old Mackinac Point are prominent.

(40) **Channels.**–A harbor basin on the E side of Old Mackinac Point is enclosed by a railroad pier with a breakwater extending N from its outer end and by a combination breakwater and dock extending from shore on the N side of the railroad pier. The entrance to the basin, from N, is marked on either side by a light. A private fog signal is at the outer end of the railroad pier. In May 1993, the controlling depth was 10 feet except for shoaling to 7 feet along the W edge off the end of the breakwater and 9 feet near the S edge.

(41) **Dangers.**–The submerged ruins of piers are 1,200 feet N and 200 feet S of the railroad pier. Each of the ruins extends 600 feet from shore.

(42) **Wharves.**–Passenger ferries operate to Mackinac Island from the State Dock and from a private dock, 800 and 2,700 feet S of the railroad pier, respectively.

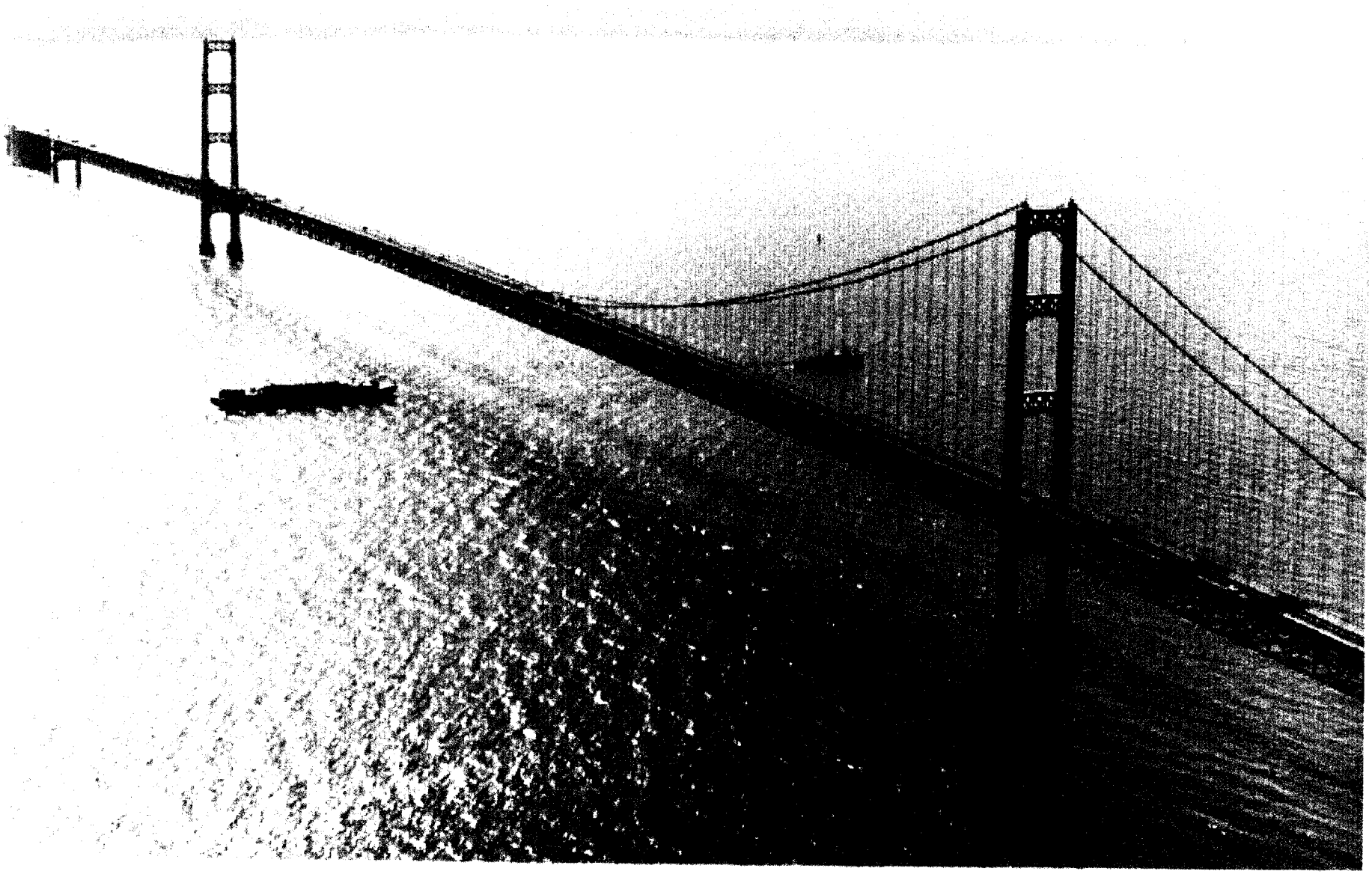
(43) Marathon Oil Co. receives gasoline and fuel oils in a slip on the N side of the State Dock. There is 175 feet of berthing space with depths of 24 feet reported alongside and a deck height of 16 feet. The wharf has tank storage for 110,000 barrels of products.

(44) **Small-craft facilities.**–

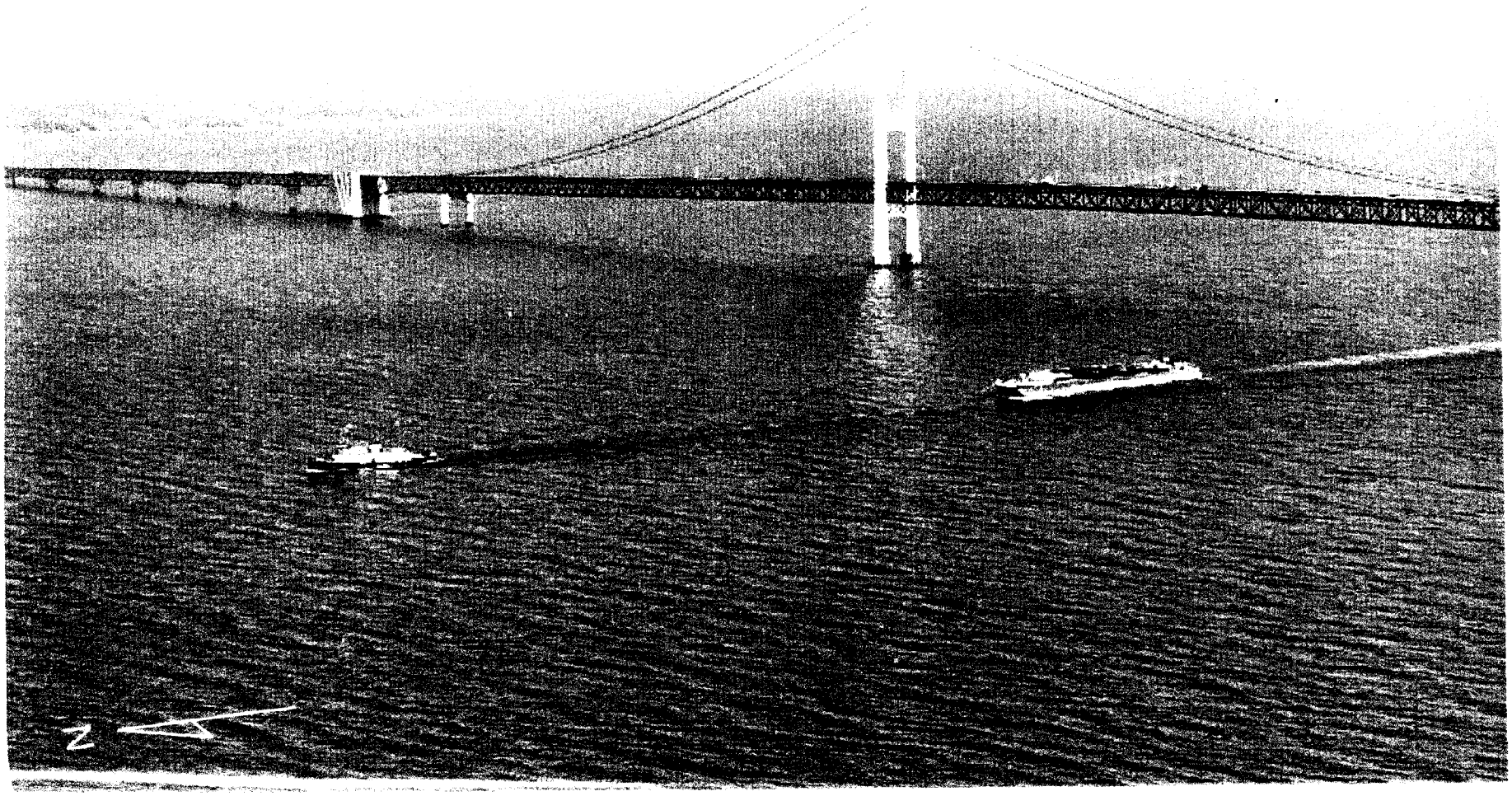
(45) A marina developed by the Michigan State Waterways Commission is in the harbor basin. Transient berths, gasoline, diesel fuel, water, electricity and sewage pump-out are available in the basin. A private marina has a 12-ton hoist for hull and engine repairs.

(46) **Mackinac Bridge** crosses the Straits of Mackinac between Mackinaw City and St. Ignace to connect the upper and lower Michigan peninsulas. The center span of the suspension bridge is 3,000 feet wide with a vertical clearance of 148 feet at the center decreasing to 135 feet at each end. The N and S suspension spans are each 1,720 feet wide with clearances of 129 feet decreasing to 86 feet at the shoreward ends. Between each of these spans and the adjacent cable anchor piers, fixed spans have clearances of 86 feet decreasing to 52 feet at the anchors. The S bridge approach has 16 fixed spans with clearances of 75 to 20 feet. The

# Mackinac Bridge



## Mackinac Bridge (II)



N bridge approach has 12 fixed spans with clearances of 75 to 20 feet.

(47) The lake approaches to the center suspension span are marked by lighted and unlighted buoys. A private fog signal is under the center span on the channel line. Obstructions covered 32 and 27 feet are S of the buoyed channel on the E side of the bridge in about 45°48′05.8″N., 84°43′20.0″W., and 45°48′15.8″N., 84°43′15.5″W., respectively. The least depth N of the buoyed channel is 23 feet.

(48) Between Old Mackinac Point and **McGulpin Point,** the northernmost point of the lower peninsula of the State of Michigan, 1.8miles W, a small bight has shallow water extending about 0.8 mile offshore. McGulpin Point is deep-to. Between McGulpin Point and Waugoshance Point, 11.5 miles W, the shore is indented by three shallow bays. The wide unnamed bay just SW of McGulpin Point has depths less than 15 feet extending 1.5 miles from its head. It affords protection in NE to SW winds. **Cecil Bay,** just W, has shallows extending 0.5 mile from shore. From the E point of the bay a very shallow bank extends 0.4 mile NW. A detached 19-foot spot is 1.1 miles N of this point. **Big Stone Bay,** just W of Cecil Bay, has deep water within 0.3 mile of its head. W from Big Stone Bay the shoal border increases to a width of about 2 miles abreast the outer end of Waugoshance Point.

(49) **Charts 14880, 14902, 14911.–Waugoshance Point** (45°45.5′N., 85°00.6′W.) is a narrow strip of land jutting 2 miles W from the shoreline. Very shallow waters, rocks awash, and a group of small islands extend 3.5 miles W from the extremity of the point to just beyond **Waugoshance Island.** This area is the outcropping of an extensive bank that reaches 1.2 miles W and about 2 miles NW from Waugoshance Island. The bank, with depths of 3 to 8 feet at the outer end, is marked near the NW extent by an abandoned lighthouse. Protective riprap extends 25 feet from the base of the structure. The shoals N and W of the lighthouse, Grays Reef Passage, and the islands and shoals of the Beaver Island group will be described later.

(50) **Sturgeon Bay** is a broad bay open to the W between Waugoshance Point on the N and **Sturgeon Bay Point** on the S. The N part of the bay is filled with a shallow flat over rock bottom. A shoal with depths less than 6 feet extends 0.5 mile NW from Sturgeon Bay Point.

(51) **Chart 14880.**–From Sturgeon Bay Point, the shore extends S and then rounds SW for about 16 miles to **Sevenmile Point** (45°28.7′N., 85°05.5′W.). The shoal border in this stretch is generally less than 0.7 mile wide, except in the vicinity of Cross Village where the 24-foot contour is 1.2 miles offshore.

(52) **Cross Village, Mich.,** is about 8 miles S of Waugoshance Point and 2 miles S of Sturgeon Bay Point. In 1978, the former small-craft basin had partially filled with sand and gravel, and the breakwater was in ruins. No shelter is available at Cross Village.

(53) **Charts 14880, 14902, 14913.–Little Traverse Bay** indents the E shore of Lake Michigan between Sevenmile Point and **Big Rock Point** (45°21.7′N., 85°12.1′W.). The bay is about 10 miles wide at the entrance, narrowing to 2 miles wide at its head, 11.5 miles E. The bay, with deep water and good holding ground, provides protection in all but W winds. Shoals extend about 0.5 mile off the NW shore and the head of the bay, but otherwise the shores are generally deep-to.

(54) **Harbor Point** is a narrow spit that extends SE from the N shore of Little Traverse Bay to protect the harbor at Harbor Springs. **Little Traverse Light** (45°25.2′N., 84°58.6′W.), 72 feet above the water, is shown from a white skeleton tower on the end of the point.

(55) **Harbor Springs, Mich.,** on the N shore of Little Traverse Bay, is a fine small-craft harbor of refuge affording security in any weather. On the N shore of the harbor, docks extend to 10 to 12 feet of water, with 16 feet at the end of the city dock.

(56) **Local harbor regulations** are established by the Harbor Springs City Council and are enforced by the **harbormaster.** A **slow-no wake speed** is enforced within the limits of the harbor. Copies of the regulations may be obtained from the Harbormaster, City of Harbor Springs, 349 East Main Street, Harbor Springs, Mich. 49740.

(57) A **special anchorage** area, marked by lighted buoys, is on the N side of the harbor. (See **110.1 and 110.82a,** chapter 2, for limits and regulations.)

(58) **Small-craft facilities.**–A municipal marina constructed by the Michigan State Waterways Commission and the city, and private marinas provide transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, sewage pump-out, launch ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9.Hoists to 50 tons and a marine railway for craft to 75 feet long are available for all types of marine repairs.

(59) The W terminus of the Inland Route, which connects Crooked Lake, Crooked River, Burt Lake, Indian River, and Mullett Lake to the Cheboygan River and Lake Huron, is about 2.5 miles E of the head of Little Traverse Bay. There is no navigable connection from Lake Michigan to the Inland Route, but an overland portage service is available for trailerable craft to 25 feet and 5,000 pounds. (For complete information see Inland Route, chapter 10.)

(60) **Petoskey, Mich.,** is on the S side near the head of Little Traverse Bay. A small-craft harbor at Petoskey is protected on the W by a breakwater extending N from shore and marked on the outer end by a light. The breakwater should not be passed close aboard due to large riprap stones along the sides and end. Depths in the harbor are about 24 feet at the outer end of the breakwater decreasing to 8 and 13 feet at the outer ends of the W and E municipal piers, respectively, with lesser depths at the berths.

(61) Anchorage ground in the harbor is poor, being stony bottom.

(62) A **speed limit** of 8 mph (7 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

(63) **Small-craft facilities.**–The municipal marina constructed by the city and the Michigan State Waterways Commission on the SE side of the harbor provides transient berths, gasoline, water, electricity, sewage pump-out, launching ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9.

(64) **Prominent features.**–Storage silos of a former cement plant areprominent, on the S shore of Little Traverse Bay about 2.5 milesW of Petoskey.

(65) Big Rock Nuclear Power Plant is on Big Rock Point on the S side of the entrance to Little Traverse Bay. A large green domed building and a lighted stack provide excellent landmarks.

(66) From Big Rock Point, the shore trends SW for about 4 miles to Charlevoix. Deep water is about 0.4 mile offshore in this stretch.

(67) **Charts 14913, 14942.–Charlevoix, Mich.,** is a city and harbor at the mouth of **Pine River,** about midway of the rounding shore between Little Traverse Bay and Grand Traverse Bay. A floodlighted water tank on the S side of the harbor entrance is prominent.

(68) **Channels.**–A dredged entrance channel leads SE from Lake Michigan between parallel piers through the lower portion of Pine River to Round Lake, the harbor proper of Charlevoix. The outer ends of the piers are marked by lights. From the E end of Round Lake, a dredged channel leads SE through the upper portion of Pine River to Lake Charlevoix, entered about 1 mile distant from the Lake Michigan shoreline. Mooring to the Government piers or revetments is prohibited.

(69) In May-June 1995, the controlling depth was 17 feet from deep water in the lake to Round Lake, thence 17 feet from Round Lake to Lake Charlevoix.

(70) **Round Lake,** about 0.4 mile in diameter, has depths to 60 feet, with deep water generally close to shore. The lake has good anchorage.

(71) **Anchorages.**–A special anchorage, marked by buoys in the N part of Round Lake, has good holding ground, sand and gravel bottom. (See **33 CFR 110.1 and 110.82,** chapter 2, for limits and regulations.)

(72) **Bridges.**–Bridge Street (U.S. Route 31) bridge crosses Pine River just below Round Lake. The bridge has a bascule span with a clearance of 16 feet. (See **33 CFR 117.1 through 117.59 and 117.641,** chapter 2, for drawbridge regulations.)

(73) **Currents.**–Currents in Pine River are reported to reverse twice daily with a velocity up to 3 mph. At times they may reach a velocity up to 5 mph.

(74) **Charlevoix Coast Guard Station** is on the N side of the Pine River entrance to Lake Charlevoix.

(75) **Harbor regulations.**–Federal regulations specify a **speed limit** of 8 mph (7 knots) in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) Local harbor regulations have been established by the city of Charlevoix and are enforced by the **harbormaster.** A **slow-no wake speed** is enforced. Copies of regulations may be obtained from the Chief of Police, City Hall, 210 State Street, Charlevoix, Mich. 49720.

(76) **Small-craft facilities.**– A marina, developed by the Michigan State Waterways Commission and operated by the city, is on the W side of Round Lake. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. Hoists to 20 tons are available for hull and engine repairs.

(77) **Ferry.**–Ferry service is available between Charlevoix and St. James Harbor on Beaver Island from April to December. Reservations are required for autos, but not for passengers or freight. The ferry terminal is on the W shore of Round Lake about 300 feet SE of the U.S. Highway 31 bridge.

(78) **Lake Charlevoix** extends about 14 miles SE from the head of Pine River and is from 1 to 2 miles wide, with depths to over 100 feet and deep water generally close to shore. **Boyne City, MI,** is at the SE end of the lake.

(79) A marina developed by the Michigan State Waterways Commission provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, launching ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. The private marina offers engine,hull, and sailboat rigging repairs. At **Advance, Mich.,** about 2.5 miles W of Boyne City, the Northern Michigan Electric Cooperative, Inc. has a coal dock providing about 500 feet of berthing space between dolphins. The dock has a deck height of 8 feet with a depth of 20 feet reported alongside in 1978. About 5 miles from the NW end of Lake Charlevoix, **South Arm** extends 9 miles S from **Ironton** at the N end to **East Jordan** at the S end. A marina developed by the Michigan State Waterways Commission at East Jordan provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9.

(80) A **slow-no wake speed** is enforced in the narrows of South Arm opposite Ironton. (See Small-craft Regulations, State of Michigan, chapter 3.)

(81) **Cable Ferry.**–A cable ferry crosses South Arm at Ironton. The self-propelled ferry is guided across the 600-foot-wide channel by two cables which are anchored ashore and pass along each side of the ferry at deck level. The cables are at a depth of about 20 feet at midchannel when the ferry is docked on either shore. When the ferry is at midchannel, the cables are at their least depths. The ferry should not be passed within about 200 feet when docked at either shore. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

(82) From Charlevoix W for 1.8 miles to **South Point** (45°19.3′N., 85°18.0′W.), shoals extend about 0.25 mile offshore. A lighted bell buoy marks the N extent of the shoals off South Point.

(83) The Medusa Cement Co. has a facility for shipping cement and receiving coal on the E side of South Point about 1.5 miles W of Charlevoix. Lighted loading silos and the tallest stack (45°19′01.5″N., 85°18′00.8″W.) at the facility are prominent. A breakwater formed by two sunken barges extends about 1,600 feet lakeward from the shore and affords protection for the privately dredged channel along its S side and for the loading slip at its inner end. A private light marks the outer end of the breakwater. The entrance channel and slip are reported to be dredged to 24 feet annually. The slip is about 100 feet wide. The N side, 645 feet long, is used to ship cement. The S side, 556 feet long, is used to receive coal for plant consumption. The docks have a deck height of 10 feet, and there is silo storage for 120,000 tons of cement. Six spouts can load vessels at 3,000 tons per hour.

(84) **Chart 14913.–Fisherman Island,** about 4 miles SW of South Point, is on the NE side of the entrance to Grand Traverse Bay. The island is on a stony bank that extends about 1 mile NW from shore with depths of 6 to 9 feet at the outer edge. A buoy marks the extent of the bank.

(85) **Grand Traverse Bay,** separated from Lake Michigan by the **Leelanau Peninsula,** extends S from the lake for about 32 miles and is about 10 miles wide. The upper 17 miles of the bay are divided into **East Arm** and **West Arm** by a narrow peninsula that extends N and terminates in Old Mission Point. The shores of Grand Traverse Bay are generally hilly and wooded.

(86) The E shore of Grand Traverse Bay, from Fisherman Island to the S end of East Arm, is bordered by shoals, rocky spots, and ledges, and should not be approached closer than 1 mile. A shoal with a least depth of 15 feet is 2.8 miles off the E shore of the bay 11.5 miles S of Fisherman Island. A lighted bell buoy marks the W side of the shoal.

(87) **Elk Rapids, Mich.,** is a village and small-craft harbor on the E shore of the bay about 12 miles from the head of East Arm at the mouth of **Elk River.** The harbor is entered through an entrance channel that leads S from the bay between two breakwaters to a basin at the river mouth. The outer ends of the breakwaters are marked by private lights, and the channel is marked by private buoys and a private leading light on the point inside the breakwaters. The entrance channel has been privately dredged to a depth of about 5½ feet.

(88) A marina developed by the Michigan State Waterways Commission in the harbor provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, launching ramp, and

harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9.

(89) At **Deepwater Point,** on the E shore about 3 miles from the head of the East Arm, there are piles formerly used for mooring self-unloading coal vessels. **Cuttysark Harbor,** 1.2 miles S of Deepwater Point, has a marina which provides transient berths, gasoline, diesel fuel, water, electricity, and sewage pump-out. The outer ends of the breakwaters are marked by private lights. A shallow flat, with depths less than 18 feet, extends 1.3 miles from the head of East Arm.

(90) **Elk Lake, Lake Skegemog, Torch Lake, Clam Lake, Bellaire Lake,** and their connecting waters are adjacent to and generally parallel the E shore of East Arm. These waterways are used by small craft, but there is no navigable outlet from any of these lakes to Grand Traverse Bay.

(91) Lake Skegemog, opening from the SE side of Elk Lake, is about 3.5 miles long and 1.3 miles wide. From it the Torch River extends about 2 miles N to Torch Lake, about 18 miles long N and S with a width of from 1 to 2 miles. From the E side of Torch Lake at Clam River, about 6 miles from its S end, a passage leads E through Clam Lake, and thence N into Bellaire Lake. From the E side of Bellaire Lake, a channel extends N about 2.5 miles to Intermediate Lake, but at the town of Bellaire, about 1.5 miles from Bellaire Lake, a dam across the stream bars passage through to Intermediate Lake.

(92) A **slow-no wake speed** is enforced on Torch River and the adjacent waters of Torch Lake for 300 feet, on Clam River from Torch Lake to Clam Lake, on Grass River from Clam Lake to Lake Bellaire, and on Intermediate River from Lake Bellaire to Intermediate Lake.

(93) The W shore of East Arm may be approached within 0.3 mile except in the upper 2.5 miles where shoals extend 0.5 mile offshore. **Old Mission Harbor,** 2.5 miles S of Old Mission Point, affords good shelter in winds from SW through N to E. Deep water is within 0.1 mile of the head of the bay and the NE shore. Shoals extend 0.25 mile off the SW shore, and a shoal extends about 0.3 mile SE from the E point of the bay. In 1983, a submerged obstruction was reported to be SE of Old Mission Harbor in about 44°57′30.7″N., 85°28′24.5″W. to Old Mission Point, shoals extend 0.3 mile off. At **Old Mission Point** (44°59.5′N., 85°28.8′W.), marked by an abandoned lighthouse, a shoal bank, with depths less than 12 feet near the outer edge, extends 1.5 miles N and W. The bank should not be navigated, even by small craft.

(94) **Mission Point Light,** on a detached shoal 2 miles NW of Old Mission Point, is a guide into the East and West Arms of Grand Traverse Bay. A small rocky ledge, covered 22 feet, is 1.7 miles NE of the light.

(95) From Old Mission Point, the E shore of West Arm extends 2 miles SW to **Merril Point,** thence 6 miles S to **Tucker Point** (44°53.4′N., 85°33.5′W.). Along this stretch, the shoal border gradually widens from 0.2 mile to 0.75 mile, just N of Tucker Point. A shoal, with several bare spots, extends 0.4 mile S from Tucker Point; the S extent of the shoal is marked by a buoy.

(96) **Bowers Harbor,** enclosed on the W by Tucker Point, provides secure anchorage with shelter from all but SW winds. A marina on the NE side provides transient berths, gasoline, water, electricity, a launching ramp, and limited hull and engine repairs to trailerable craft. **Marion Island** is off the mouth of Bowers Harbor, 1.3 miles SW of Tucker Point. Shoals extend 0.4 mile N and 0.9 mile SW from the island. Buoys mark the NE and SW extent of the shoals. A wreck, covered 32 feet, is just N of the buoy marking the SW shoal.

(97) The E shore of West Arm, from Bowers Harbor to the head at Traverse City, is clear to within 0.25 mile.

(98) **Traverse City, Mich.,** at the head of West Arm, is the principal harbor on Grand Traverse Bay. Prominent are the stack and chimneys of the city powerplant and the Park Place cupola, about 2,400 feet SE of the powerplant. The principal cargoes handled in the port are petroleum products and coal. Good anchorage is available off the city.

(99) The **Great Lakes Maritime Academy** of Northwestern Michigan College is in Traverse City, Mich. Maritime oriented courses, including seamanship, navigation, communication, and maritime law, prepare cadets for positions aboard Great Lakes ships. Further information may be obtained from The Dean of Admissions, Northwestern Michigan College, 1701 East Front Street, Traverse City, Mich. 49684.

(100) **Channels.**–A dredged basin is on the W side of West Arm about 1.5 miles N of the city. The basin is formed by a breakwater extending S from shore on the E side and a detached breakwater on the S side. The outer ends of the breakwaters are marked by lights. In August 1982, the controlling depths were 12 feet in the S part of the basin and 10 feet in the N part except for shoaling to 5 feet along the E edge and 8 feet in the NE corner.

(101) **Boardman River** flows from **Boardman Lake** through Traverse City and empties into the head of West Arm. The mouth of the river is protected by parallel piers; the outer end of the W pier is marked by a private light. The river has depths of about 2 feet for 0.3 mile, thence 1 foot to a dam 1.2 miles above the mouth. Currents in the river are swift. Below the dam, the river is crossed by six fixed highway bridges with a minimum clear width of 10 feet and a minimum clearance of 5 feet.

(102) **Traverse City Coast Guard Air Station,** is about 2 miles SE of the mouth of Boardman River. The air station supports Coast Guard surface operations, carries out search and rescue missions, and renders airborne assistance. The air station can be contacted on VHF-FM channel 16 or through the nearest Coast Guard station.

(103) **Harbor regulations.**–Local harbor regulations are established and enforced by the **harbormaster** who can be reached at the Traverse City Police Department, 520 W. Front Street, Traverse City, Mich. 49684. Copies of the regulations can be obtained from the harbormaster.

(104) **Wharves.**–Traverse City has three active deep-draft facilities. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

(105) **Traverse City Coal Dock:** (44°47′11″N., 85°38′08″W.); 210-foot face; 18 feet alongside N end; deck height, 6 feet; vessels dock port side to; open storage for 16,000 tons of coal; receipt of coal and slag; owned and operated by city of Traverse City.

(106) **Naph-Sol Refining Co. Dock:** 0.2 mile S of Coal Dock; 300 feet of berthing space along dolphins; 32 feet alongside; tank storage for 7¼ million gallons; receipt of light oils; owned and operated by Naph-Sol Refining Co.

(107) **Total Petroleum, Inc. Dock:** 0.25 mile S of Coal Dock; 375 feet of berthing space along dolphins; 23 feet alongside; deck height, 10 feet; tank storage for about 10½ million gallons; receipt of petroleum products; owned and operated by Total Petroleum, Inc.

(108) **Small-craft facilities.**– A public small-craft basin contructed by Traverse City and the Michigan State Waterways Commission is protected by breakwaters, about 2,800 feet W of the mouth of Boardman River. The entrance to the basin is marked on the N side by a private light. Transient berths, gasoline, water,

electricity; sewage pump-out, launching ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9.

(109) A small-craft basin protected by breakwaters is at **Greilickville**, about 2 miles NW of the Traverse City docks. The outer ends of the breakwaters are marked by lights. A dredged channel leads N from deepwater in Grand Traverse Bay through the breakwaters to a mooring basin. In September 1996, the controlling depths were 14 feet in the channel between the breakwaters, thence 10 feet in the basin except for shoaling to 4½ feet in the NE corner of the basin. A seasonal facility constructed by the city and the Michigan State Waterways Commission is on the W side of the basin and a private marina is at the N end of the basin. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, marine supplies, launch ramp, and harbormaster services are available. The harbormaster may be contacted during the boating season by calling 616-946-5463. At the private marina, a 30-ton mobile hoist is available for hull and engine repairs. In 1978, depths of 7 to 15 feet were reported alongside the docks, with 10 feet at the fuel pumps.

(110) N from Traverse City for 11 miles to **Lee Point** (44°55.5′N., 85°36.2′W.), shoals extend about 0.3 mile offshore, except at a point 2 miles N of Traverse City where a shoal with a least depth of 6 feet extends 0.5 mile offshore. The outer edge of the shoal is marked by a lighted buoy. The buoy is sometimes difficult to distinguish at night because of vehicle taillights on the shore highway. A shoal with depths of 7 to 18 feet extends 2.5 miles S from Lee Point. The S end is marked by a buoy. From Lee Point N for 5.5 miles to **Stony Point (Suttons Point),** shoals extend no more than 0.6 mile offshore. A lighted bell buoy 0.7 mile NE of Lee Point marks the outer edge of the shoal bank. A buoy marks the outer edge of the shoal that extends 0.3 mile N from Stony Point.

(111) The shore from Stony Point N to **Omena Point** has generally deep water within 0.4 mile. **Omena Bay,** behind Omena Point, has good water with secure anchorage and shelter from all winds from SW through N to E. Gasoline is available at a small marina at **Omena, Mich.,** at the head of Omena Bay. In 1978, a depth of 5 feet was reported alongside.

(112) **Suttons Bay** extends 2.5 miles SW from Grand Traverse Bay on the W side of Stony Point. The bay affords good anchorage with protection from all but NE winds. Shoals extend 0.2 mile from the E shore and head, and 0.4 mile from the W shore. **Suttons Bay, Mich.,** is a village on the W side of the head of the bay. A public small-craft facility constructed by the Michigan State Waterways Commission at the village provides transient berths, gasoline, water, electricity, sewage pump-out, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. Limited repairs are available.

(113) **Northport Bay** is an indentation on the W side of Grand Traverse Bay between Omena Point and **Northport Point,** Shelter is available in the bay from all but SE winds, but the holding ground is poor, being either mud or rock. A shoal marked at the outer edge by a lighted bell buoy extends 0.5 mile SE from Northport Point. Shoals extend no more than 0.5 mile offshore in the bay, but there are several dangerous detached shoals in the bay. About 0.5 mile W of Northport Point, a shoal with rocks awash is about 1.2 miles long N and S. A buoy marks the S end of the shoal. A 3-foot shoal, marked on the S side by a buoy, is 1 mile W of Northport Point. **Bellow Island** is in the entrance to the bay, 2.4 miles S of Northport Point. Shoals extend about 0.3 mile off around the island. Two 14-foot spots are 1 mile N and a 17-foot spot is 0.6 mile NW of Bellow Island.

(114) **Northport, Mich.,** is a village and small-craft harbor on the W side of Northport Bay. A breakwater marked at the outer end by a private light protects a small-craft basin constructed by the village and the Michigan State Waterways Commission. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, launching ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. A marine railway for craft to 65 feet and 30 tons, and a mobile hoist for sailing craft to 42 feet, are available for hull and engine repairs about 1 mile N of the village.

(115) From Northport Point N to Lighthouse Point, deep water is generally within 0.5 mile of shore. An 18-foot spot is 1 mile offshore 4.3 miles NE of Northport Point. **Lighthouse Point** is the N end of the Leelanau Peninsula, which separates Grand Traverse Bay from Lake Michigan. Shoals extend 0.7 mile N from the point. **Grand Traverse Light** (45°12.6′N., 85°33.0′W.), 50 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on Lighthouse Point.

(116) **Charts 14902, 14911.**–An extensive area of off-lying islands and shoals is in Lake Michigan from the vicinity of Waugoshance Point SW to Lighthouse Point.

(117) A group of shoals about 4 miles long E and W has its N limit about 3.5 miles N of Waugoshance Island along the S side of the vessel route between the Straits of Mackinac and Grays Reef Passage. **Rose Shoal,** the southernmost of the group, has a least depth of 11 feet 2.6 miles NNW of Waugoshance Island. Bordering the S side of the vessel route, **New Shoal No. 1,** the easternmost of the group, has a depth of 14 feet over boulders. **New Shoal No. 3,** the westernmost of the group, has a least depth of 16 feet. A lighted bell buoy at the NW end of the shoal marks the E side of the route through Grays Reef Passage. **New Shoal No. 2,** midway between the other two, has a least depth of 17 feet and is marked on the N side by a lighted buoy. A group of wrecks, covered 20 feet, is 0.7 mile N of New Shoal No. 2.

(118) **White Shoal,** 6.2 miles NW of Waugoshance Island, is about 2 miles long E and W. The W end of the shoal is awash. **White Shoal Light** (45°50.5′N., 85°08.1′W.), 125 feet above the water, is shown from a red and white spirally banded conical crib on the E end of the shoal. A fog signal and a radar beacon (Racon) are at the light. Riprap extends 25 feet from the base of the light and it should not be passed close aboard even by shallow-draft vessels. A buoy marks the W end of White Shoal. An 18-foot shoal is 0.8 mile NW of the buoy, and several shoal spots with depths of 20 to 30 feet are close around White Shoal.

(119) **Simmons Reef,** about 5 miles NW of White Shoal, is about 2.8 miles long E and W and 1.6 miles wide. The reef has a rock awash near its center and depths of 3 to 6 feet scattered over a large area. The reef is dangerous in that it is composed of boulders that make up quickly from deep water. A lighted bell buoy marks the S side of the reef.

(120) **Fagan Reef,** 3 miles NW of Simmons Reef, is about 4 miles long and 2 miles wide. It has numerous shoal spots with depths less than 24 feet and a least depth of 10 feet at its W end.

(121) St. Helena Island and Shoal, Manitou Paymen Shoal, and other shoals along the N shore are discussed with the N shore of Lake Michigan.

(122) **Vienna Shoal,** with a least depth of 12 feet, is 2.4 miles WNW of Waugoshance Island on the E side of Grays Reef Passage. **East Shoal,** 1.4 miles SSW of Vienna Shoal, has a least depth of 17 feet. A lighted buoy on the W end of the shoal marks the E side of the dredged channel through Grays Reef Passage.

(123) **Grays Reef** is an extensive area of shallow water over rocks that extends from Grays Reef Passage W for 8.5 miles to Hog Island. The reef has depths ranging from rocks awash to 18 feet.

(124) **Grays Reef Passage,** between Vienna Shoal and East Shoal on the E and Grays Reef on the W, is the main route for vessels drawing less than 25 feet between the Straits of Mackinac and harbors S in Lake Michigan. The passage is obstructed at the center by **Middle Shoal,** with a depth of 17 feet, and by a bank with depths of 21 to 25 feet and a dumping ground close N of Middle Shoal. The main vessel route through the passage is a dredged channel, marked by a light and lighted and unlighted buoys, on the E side of Middle Shoal. **Grays Reef Light** (45°46.0′N., 85°09.2′W.), 82 feet above the water, is shown from a white square tower on the W side of the dredged channel, just SE of Middle Shoal. A fog signal and a radar beacon (Racon) are at the light. The light should not be passed close aboard due to protective riprap. From the N end, the course through the channel is **186°** to Grays Reef Light and thence **216½°** toward North Manitou Shoal Light. In September 1991, the controlling depth was 25 feet in the dredged channel. The channel through Grays Reef Passage on the W side of Middle Shoal is unmarked and no longer used by large vessels.

(125) Grays Reef Passage is a **regulated navigation area.** (See **33 CFR 165.1 through 165.13, and 165.901 (b) and (c),** chapter 2, for limits and regulations.)

(126) **Ile aux Galets** (locally pronounced skill-a-gal-lee) is a small island 7.7 miles SW of Waugoshance Island on the E side of the approach to Grays Reef Passage from the S. Shoals that extend 1.8 miles E from the island are marked at the outer end by a buoy, and shoals that extend 0.5 mile NW from the island are marked by a buoy. **Ile aux Galets Light** (45°40.6′N., 85°10.3′W.), 58 feet above the water, is shown from a white octagonal tower on the island.

(127) **Dahlia Shoal,** 3.7 miles SSW of Ile aux Galets, has a least depth of 14 feet and is marked on the W side by a buoy. A 21-foot spot is 1 mile NE of the buoy.

(128) **Hat Island,** the easternmost of the island group lying W of Grays Reef Passage, is on the N edge of Grays Reef, 11.5 miles WNW of Waugoshance Island and 10.5 miles NE of Beaver Island. Shoals extend 0.5 mile N from the island.

(129) **Hog Island,** 5.5 miles NE of Beaver Island, is low and wooded and completely surrounded by very shallow flats. Grays Reef extends E from the island, and shoals extend about 1.5 miles N and 2.5 miles S from the island. A very shallow bank, with numerous rocks awash, connects the island to Garden Island, 3 miles W. There is no vessel passage across the bank, which extends about 2 miles S from a line connecting the S ends of the islands. **Hog Island Reef,** a detached shoal 3.2 miles SSE of the island, has a least depth of 5 feet and is marked on the E side by a buoy.

(130) **Garden Island,** 1.5 miles N of Beaver Island, is generally high and wooded and is surrounded by shoal water. **Garden Island Shoal,** 2.5 miles N of Garden Island, has a least depth of 15 feet and is marked at the NE end by a lighted bell buoy. A shoal with a least depth of 16 feet is 1.2 miles N of Garden Island.

(131) **Squaw Island,** 3 miles WNW of Garden Island, is the northwesternmost of the island group W of Grays Reef Passage. An abandoned lighthouse is on the N end of the island. A shoal bank extends about 0.7 mile from the E, S, and W shores of the island; a buoy marks the outer edge of the bank on the E side. A shoal with depths of 6 to 16 feet that extends about 2 miles NNE from the island is marked at the outer end by a buoy. A detached 14-foot shoal is 1.8 miles NE of the island, and rocky spots covered 12 to 17 feet are 1 mile NW of the island.

(132) **Whiskey Island** is about 3.5 miles W of Garden Island and 1.7 miles SW of Squaw Island. Shoals extend about 0.5 mile offshore around the island, except about 1 mile E and SE. A buoy is 1 mile ESE of the island. A large detached bank, with several spots awash, is 1.2 miles SW of the island. The S side of the bank is marked by a buoy.

(133) In the passage between Garden Island on the E and Squaw and Whiskey Islands on the W, numerous detached ledges and spots have depths of 1 to 14 feet. Passage without local knowledge, by even shallow-draft vessels, is not recommended.

(134) **Lansing Shoals,** an extensive area of boulders with depths less than 24 feet, is from 4.4 to 6.2 miles N of Squaw Island. The shoalest spot, covered 13 feet, is at the SE end of the ledge. **Lansing Shoals Light** (45°54.2′N., 85°33.7′W.), 69 feet above the water, is shown from a square gray tower on the S side of the 13-foot spot; a seasonal fog signal and racon are at the light. Rip-rap extends 50 feet from the base of the light, and it should not be passed close aboard even by shallow-draft vessels. The light marks the N side of the vessel route from the Straits of Mackinac for vessels drawing over 25 feet.

(135) **Beaver Island,** the principal island in the group W of Grays Reef Passage, is 13 miles long N and S with a maximum width of 6.5 miles. The wooded island is bluff on the W side and lower on the E side. Shoals extend about 0.5 to 1 mile offshore around the island, except in Sandy Bay, about midlength of the E side, where deep water is within 0.2 mile of shore.

(136) The shoal bank that extends 0.7 mile NE from Beaver Island is marked at the outer edge by a lighted buoy. A 3-foot depth is just inside the buoy.

(137) Several reefs with depths of 8 to 12 feet are 1.5 miles E and 0.8 mile NE from the NE end of Beaver Island. These limit the draft for vessels navigating the channel between the shoal banks that extend off the N side of Beaver Island and the S side of Garden Island.

(138) **St. James Harbor** is a bight near the NE end of Beaver Island and is the harbor for the village of **St. James, Mich.,** on the NW side of the harbor. The harbor is protected on the E by **Sucker Point** and provides protection from all but SE winds. Sucker Point is marked on the SW side by **St. James Light** (45°44.6′N., 85°30.5′W.), 38 feet above the water and shown from a white cylindrical tower. Deep water extends from the lake across the center of the harbor, with the S end of the harbor shoal. Another shoal extends W across the harbor from Sucker Point to St. James, with deep water on the N side of the shoal near the head of the harbor. In September 1998, the dredged channel across the shoal had a controlling depth of 13 feet.

(139) Vessels approaching St. James Harbor must take care to avoid the shoal bank that extends S and E from Sucker Point. A lighted buoy and a buoy mark the S and SE limits of the bank, respectively. On the S side of the harbor entrance, shoals extend about 0.4 mile NE and 1 mile SE from **Looney Point.** The limits of these shoals are marked by a buoy and a lighted bell buoy, respectively. A detached gravel and boulder bank, covered 14 feet, is about 2 miles E of Looney Point.

(140) **Small-craft facilities.**–A public dock constructed by the village and the Michigan State Waterways Commission at St. James provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. Hoists to 30 tons are also available in St. James.

(141) **Ferry.**–Ferry service is available between St. James Harbor and Charlevoix, Mich., from April to December. Reservations are required for autos, but not for passengers or freight. The ferry terminal is 0.5 mile NW of St. James Light.

(142) **High Island,** about 3.8 miles W of the N end of Beaver Island, is a wooded island with a high sand ridge along the length of the W side. Shoals extend to 1 mile off the W shore and 0.5 to 0.8 mile off the S and E shores, except at the NE end of the island where a narrow point extends 0.5 mile E. Under this point, deep water is close-to, and good anchorage is available with protection from all but E and SE winds. Shoals extend 1.2 miles N and NE from this point. A shoal bank with depths of 12 to 15 feet extends about 2 miles NW from High Island and connects with the shoals surrounding Trout Island.

(143) **Trout Island,** 1.6 miles N of High Island, is connected to it by a shoal bank. Passage between the islands is unsafe for vessels drawing over 6 feet. A 4-foot spot 0.6 mile S of Trout Island must be avoided. Shoals extend about 0.2 to 0.5 mile offshore around Trout Island. **Trout Island Shoal,** 1.9 miles W of Trout Island, has a least depth of 11 feet and is marked on the NW side by a buoy.

(144) **Gull Island,** 6.7 miles W of High Island, is low, flat, and somewhat wooded. Shoals extend generally 0.5 mile offshore, except for banks that reach 1 mile SSE and 1.7 miles NE. Detached 21- and 23-foot spots are 1 mile NNW and 1.6 miles SE of the island, respectively. **Gull Island Light** (45°42.7′N., 85°50.6′W.), 77 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on a bare spot close NW of the island. **Gull Island Reef,** about 4 miles SE of the island, has a least depth of 3 feet and depths of 9 to 15 feet over a large area.

(145) **Richards Reef,** about 8 miles W of Beaver Island Light, is covered 22 feet.

(146) **Boulder Reef,** 9.5 miles SW of Gull Island, has a least depth of 15 feet and is marked on the S side by a lighted bell buoy.

(147) **Charts 14902, 14912.–North Fox Island,** 10 miles SW of Beaver Island, is wooded. Shoals extend no more than 0.3 mile offshore except on the S and W sides where depths of 5 to 13 feet reach 1 mile from shore.

(148) **South Fox Island,** 4 miles SW of North Fox Island, is hilly on the W side and lower and wooded on the E side. An abandoned lighthouse is on the S end of the island. The E and W sides of the island are fairly deep-to, except for a 13-foot spot that reaches 0.8 mile off the W shore. A shoal bank and detached 18- to 21-foot spots reach 2.4 miles N from the island. A detached 21-foot spot is 3.3 miles N of the island. Shoals extend 0.8 mile around the S point of the island.

(149) **Caution.**–Currents with velocities up to 2 mph are of frequent occurrence around North and South Fox Islands. Mariners should exercise caution while navigating in the area.

(150) **South Fox Island Shoals** is an extensive bank reaching 9 miles S from South Fox Island. A lighted buoy marks the S end of the bank. The bank has general depths of 15 to 30 feet with some shoaler spots. Two 9-foot spots are 4.2 and 7 miles S of South Fox Island, and an 11-foot spot is 6.4 miles S of the island. Buoys 4.2 and 6.2 miles S of the island mark a deepwater passage through the shoals. The bottom in the vicinity of the shoals is rocky, and deep-draft vessels should exercise caution in thick weather.

(151) **Charts 14902, 14913, 14912.–Lighthouse Point** (45°12.6′N., 85°32.7′W.), the N point of the Leelanau Peninsula, is marked by Grand Traverse Light. Between Lighthouse Point and **Cathead Point,** 3.6 miles SW, **Cathead Bay** affords shelter in S winds. The bay is shoal however, with two rocky ledges that extend 0.9 mile from shore. Approaching Cathead Point from W, a clump of trees on the point gives it the appearance of an island.

(152) From Cathead Point SW for 14.5 miles to **Carp River Point,** the shore is generally bluff and hilly. Shoals extend generally less than 0.8 mile from shore, except for detached 7- and 8-foot spots 1.2 miles offshore 5 miles NE of Carp River Point. Leland, Mich., is 1.2 miles NE of Carp River Point.

(153) **Charts 14902, 14912.–Leland, Mich.,** is a village and small-craft harbor at the mouth of Leland River about 32 miles SW of Charlevoix. Local fish tugs, a log barge, and recreational craft are the principal users of the harbor.

(154) **Channels.**–The harbor is protected on the N and NW by a detached breakwater and on the SW by a pier extending lakeward from the S side of the mouth of Leland River. The outer end of the pier and the SW end of the breakwater are marked by lights. An anchorage area inside the breakwater is approached from the SW through a dredged channel between the breakwater and pier. A dredged channel leads from the S end of the anchorage to the mouth of the river, and a marina basin, maintained by private interests, is on the E side of the anchorage.

(155) In April 1998, the controlling depths were 8½ feet (12 feet at midchannel) in the entrance channel; thence in 1990, 9 feet in the anchorage area. In 1983, a controlling depth of 6 feet was in the channel to the mouth of the river. In 1980, 3½ feet was in the marina basin except for shoaling to bare in the N end and along the E side.

(156) **Leland River** is a narrow crooked stream about 0.8 mile long which connects Lake Leelanau to Lake Michigan. A dam crosses the river about 400 feet above the mouth. The Main Street bridge 250 feet above the dam has a vertical clearance of about 4 feet. From this bridge to Lake Leelanau, the river is navigable by shallow-draft vessels.

(157) **Lake Leelanau** is 16 miles long and as much as 1.8 miles wide. The upper and lower ends of the lake have good depths, but in the constriction near the middle of the lake at the village of Lake Leelanau, available depths are only 3 feet. A fixed highway bridge with a clearance of about 15 feet crosses the lake at the village.

(158) **Small-craft facilities.**–A public dock constructed by the Michigan State Waterways Commission in Leland harbor provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, launching ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9.

(159) **Ferry.**–Mail and ferry service is available between Leland and North and South Manitou Islands from April through December with regular service. Irregular service is available from January through March depending on ice conditions. The terminal is on the E side of the Leland River mouth.

(160) **Good Harbor Bay,** between Carp River Point and **Pyramid Point** 7.7 miles WSW, has deep water close to shore and affords protection in all but N to NE winds. However, in the NE part of the bay, an extensive rocky ledge with depths of 2 to 18 feet is 1 to 3 miles offshore.

(161) **Pyramid Point Shoal,** with a least depth of 7 feet, extends 2 miles N from Pyramid Point. A lighted buoy marks the N end of the shoal.

(162) **Sleeping Bear Bay** lies between Pyramid Point and **Sleeping Bear Point** (44°54.9′N., 86°02.5′W.), 6.8 miles SW. The shores of the bay are generally deep-to, except for a rocky ledge with depths of 4 feet that extends 0.8 mile from shore 3 miles SW

of Pyramid Point, which is bluff. The bay affords good shelter from NE through S to W winds. Very good holding ground is found under Pyramid Point. At **Glen Haven, Mich.**, a village on the SW side of the bay, the waterfront is in ruins and no services are available.

(163) **Sleeping Bear Shoal,** with boulders covered 17 to 24 feet, extends 1.2 miles W from Sleeping Bear Point. Detached spots less than 30 feet extend 4 miles farther W from the point and are marked near the outer limit by a lighted bell buoy. Vessels using Manitou Passage should keep N and W of the buoy.

(164) **Manitou Passage,** between North and South Manitou Islands and the mainland, is used by deep-draft vessels bound between Grays Reef Passage and the S end of Lake Michigan. The passage has good deep water and a least width of about 1.8 miles between Pyramid Point Shoal and North Manitou Shoals.

(165) **North Manitou Island,** 6.5 miles N of Pyramid Point, is a hilly and wooded island 7 miles long N and S and 4.2 miles wide. A lee can be found under the island with generally good holding ground. The bight on the E side affords good shelter from W winds. The N shore is deep-to with several detached spots of 24 to 29 feet. The E shore is clear to within 0.4 mile and the W shore to within 0.6 mile. A shoal bank with depths of 4 to 15 feet extends 1.5 miles S from **Donner Point** at the SW end of the island and extends E to a point 2 miles S of **Dimmicks Point.** In 1981, numerous boulders were reported to exist from close inshore to about 0.4 mile offshore between Donner and Dimmicks Points. **North Manitou Shoals,** an area of foul ground with depths of 16 to 30 feet, extend 3 miles S of Dimmicks Point and 3.5 miles S of Donner Point. A buoy marks the extent S of Donner Point. **North Manitou Shoals Light** (45°01.2′N., 85°57.4′W.), 79 feet above the water, is shown from a white square structure 2.8 miles S of Dimmicks Point; a seasonal fog signal and racon are at the light.

(166) **South Manitou Island** is 6.8 miles N of Sleeping Bear Point and 3.9 miles SW of North Manitou Island with a deep channel between. The island is hilly and bluff on the W side and lower and wooded on the E side. A 100-foot high abandoned lighthouse is on the SE point of the island. The shores of the island are relatively deep-to, except the S side where shoals with depths of 10 to 19 feet extend 1 mile offshore. A visible wreck is close to the SW shore of the island. Detached 18- and 19-foot spots are 1.5 miles S and 2.8 miles SW of the island, respectively. A lighted gong buoy is on the SW side of the 19-foot spot. **South Manitou Harbor**, on the SE side of the island, affords anchorage with good holding ground and protection from SW through N to NE winds.

(167) **Ferry.**–Mail and ferry service is available between North and South Manitou Islands and Leland during most of the year, depending on ice conditions.

(168) From Sleeping Bear Point, the shoreline trends S for 8 miles to a high rounding point known as **Empire Bluffs.** Shoals extend 0.7 mile offshore at the bluffs, and a detached 23-foot spot is 2 miles offshore. At **Empire, Mich.,** just N of the bluffs, two piers in ruins extend into the lake; in 1978, they were almost completely covered with sand.

(169) From Empire Bluffs, the shoreline continues S and then trends W to **Platte River Point** at the mouth of the **Platte River. Platte Bay** is the bight between Empire Bluffs and Platte River Point. The shore of the bay is bluff with deep water close-to. A shoal, with rocks awash and a depth of 10 feet at the outer end, extends 1.5 miles N from Platte River Point.

(170) **Charts 14902, 14907.**–From Platte River Point SW for 5 miles to Point Betsie, the shore is bold and hilly, and there are no outlying obstructions. **Point Betsie** is a rounding sandy point. **Point Betsie Light** (44°41.5′N., 86°15.3′W.), 52 feet above the water, is shown from a white cylindrical tower with a red roof and attached dwelling on the point. The light marks the turning point for vessels bound between Manitou Passage and the S end of Lake Michigan.

(171) From Point Betsie, the shore continues sandy and hilly for 4.3 miles S to Frankfort Harbor.

(172) **Frankfort Harbor,** 4.3 miles S of Point Betsie, is in Betsie Lake, connected to Lake Michigan by an entrance channel. The shore S of the entrance channel is bluff, reaching over 300 feet above the lake. The city of **Frankfort, Mich.,** is on the N side of Betsie Lake. A tank on a hill 0.75 mile NE of the harbor entrance is prominent from Lake Michigan.

(173) **Frankfort North Breakwater Light** (44°37.9′N., 86°15.1′W.), 72 feet above the water, is shown from a square white pyramidal tower on the N side of the harbor entrance. A fog signal is at the light. An aerolight is 2.1 miles NE of the light.

(174) **Channels.**–The harbor is entered from Lake Michigan through a dredged entrance channel between converging breakwaters to an outer harbor basin which is not adapted for anchorage but reduces wave action in the inner harbor. From the outer basin, the channel continues E between parallel piers to an inner basin and anchorage area in Betsie Lake. The outer ends of the breakwaters and piers are marked by lights.

(175) In 1996-August 1997, the controlling depths were 14 feet (23 feet at midchannel) in the channel through the outer basin, thence 21 feet between the piers, thence 16 feet in the inner basin except for shoaling to 13 feet in the NE corner and 13 feet in the NW corner; thence 9 feet in the anchorage area. The areas N and S of the entrance channel in the outer basin have least depths of 18 feet and 19 feet, respectively.

(176) **Betsie Lake,** extends about 1.5 miles SE from the inner end of the entrance channel. Outside the dredged areas, the lake is generally shoal, with depths of 8 feet and less. The SE end of the lake is filled with submerged pilings, and at the extreme end, off the mouth of **Betsie River,** the lake is swampy. Anchorage in the lake is poor. A private channel extends from the inner harbor basin E through Betsie Lake to a private dock. In 1975, the controlling depth in the channel was 7 feet.

(177) **Bridges.**–Betsie River is crossed near its mouth by a fixed highway bridge with a clearance of 4 feet and by a fixed railroad bridge with a 14-foot span and a clearance of 7 feet.

(178) **Currents.**–Currents in the Frankfort Harbor entrance channel attain velocities up to 3 mph in either direction.

(179) **Frankfort Coast Guard Station** is on the N side of the harbor entrance channel. A radiobeacon is at the station.

(180) **Harbor regulations.**–A **speed limit** of 8 mph is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) Mooring to the breakwaters, piers, or revetments is prohibited.

(181) A **special anchorage** area, marked by private buoys, is in Betsie Lake. (See **33 CFR 110.1 and 110.81a,** chapter 2, for limits and regulations.)

(182) **Wharves.**–Koch Fuels, Inc. receives petroleum products at a 425-foot wharf on the S side of the inner basin. The wharf has a deck height of 8 feet with reported depths of 18 to 20 feet alongside. There is tank storage for 310,000 barrels of petroleum.

(183) **Small-craft facilities.**–A public dock constructed by the Michigan State Waterways Commission on the N side of the inner basin provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. A marine railway for small craft is available in the harbor.

(184) From Frankfort S for about 19 miles to Portage Lake, the shore is bold and wooded with many hills from 300 to 400 feet high. The shore is deep-to except just S of the entrance to Arcadia Lake where depths under 24 feet extend 0.8 mile offshore. A submerged wreck is 0.5 mile offshore 6.6 miles S of Frankfort.

(185) **Arcadia Lake,** 10 miles S of Frankfort, is an L-shaped lake separated from Lake Michigan by a narrow strip of land. The N arm of the lake has depths to 26 feet and deep-to shores. The larger S part of the lake has depths over 7 feet in the W end and shoals off into heavy weeds and marsh at the E end. At the SW end of the lake an entrance channel has been dredged from Lake Michigan.

(186) **Arcadia, Mich.,** is a village at the N end of Arcadia Lake about 14 miles S of Point Betsie.

(187) Arcadia Lake is entered from deep water in Lake Michigan through a dredged entrance channel between parallel piers and revetments to the deep water inside the lake. The pierheads are marked by lights. In July 1998, the controlling depth was 9 feet in the entrance channel to the lake. The entrance channel is subject to extensive shoaling. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(188) **Small-craft facilities.**– A marina developed by the Michigan State Waterways Commission and a private marina are located in the north arm of the lake. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, limited marine supplies, launching ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. At the private marina, a 5-ton hoist is available for hull and engine repairs.

(189) **Charts 14907, 14939.–Portage Lake,** 23 miles S of Point Betsie, is separated from Lake Michigan by a narrow strip of land. The lake, 3.3 miles long and 0.6 to 1.5 miles wide, has central depths of 14 to 60 feet with gradual shoaling toward shore. A shoal with depths of 7 to 12 feet near its outer end extends 0.4 mile S from North Point, about 0.9 mile E of the entrance channel. **Onekama, Mich.,** is a village on the N side of the lake at the E end.

(190) **Channels.**–The dredged entrance channel leads from Lake Michigan between parallel piers and revetments to the deep water inside Portage Lake. The outer ends of the piers and the Portage Lake end of the S pier are marked by lights; a fog signal is at the N outer end light. In July 1997, the controlling depth in the entrance channel was 12 feet. The channel is subject to shoaling from sand swept in by shore currents. The currents in the entrance channel attain velocities up to 3 mph in either direction.

(191) Mooring to the piers and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(192) Good anchorage is available in Portage Lake.

(193) A **speed limit** of 8 mph (7 knots) is enforced in Portage Lake. (See **33 CFR 162.120,** chapter 2, for regulations.)

(194) **Small-craft facilities.**–A marina on the S side of Portage Lake just E of Eagle Point provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and marine supplies. A 14-ton mobile hoist and a 50-ton marine railway are available for hull and engine repairs. In 1978, there were reported depths of 5 to 12 feet alongside the docks and 10 feet alongside the fuel pumps.

(195) **Chart 14907.**–From Portage Lake SSW for 8.3 miles to Manistee, the shore continues somewhat bluff, generally 60 feet high, with several hills 115 to 180 feet high. The 18-foot contour is no more than 0.4 mile offshore.

(196) **Charts 14907, 14938.–Manistee Harbor,** 31 miles S of Point Betsie, is on the **Manistee River,** which flows from the N end of Manistee Lake for 1.5 miles to Lake Michigan. There are extensive facilities along both sides of the river and on the W side of Manistee Lake. The principal cargo handled is coal, with occasional shipments of salt and machinery. The harbor is also a base for fish tugs. A radio mast at the N end of Manistee Lake is prominent.

(197) **Manistee North Pierhead Light** (44°15.1′N., 86°20.8′W.), 55 feet above the water, is shown from a white cylindrical tower on the outer end of the N pier; a fog signal is at the light.

(198) **Channels.**–The entrance to Manistee River is protected on the SW by a breakwater. A dredged entrance channel leads from deep water in Lake Michigan on the N side of the breakwater to an outer harbor basin, thence between parallel piers through the mouth of the river and upstream for 1.6 miles to Manistee Lake. The outer ends of the breakwater and piers are marked by lights. In July-August 1997, the midchannel controlling depth was 23 feet in the entrance channel with 18 to 25 feet in the outer basin; thence controlling depths were 22 feet to the shoreward end of the N pier, thence 22 feet in the N half of the channel to a point about 0.52 mile above the mouth of the river, the S half of the channel shoals gradually from 22 feet at the centerline to 1 foot at the S boundary, thence 19 feet to Manistee Lake.

(199) Currents in the river attain velocities up to 3 mph in either direction.

(200) Numerous submerged pile clusters extend along the N channel limit from the outer end of the N pier to its inner end. Large pile clusters protect each end of the revetment upstream of the N pier.

(201) The outer basin, enclosed by the S breakwater and N pier, is not adapted for anchorage, but reduces wave action in the inner harbor. Mooring to the breakwater, piers, or revetments is prohibited. Large riprap stones are along both sides and across the ends of the breakwater and pier, and navigation should not be attempted close to these structures.

(202) **Manistee Lake,** about 4 miles long and up to 0.5 mile wide, has depths to 50 feet, with the shores generally deep-to. Buoys mark the outer ends of shoals and submerged dock ruins from the inner end of Manistee River S in the lake. Good anchorage is in the N part of the lake in depths of 20 to 25 feet.

(203) **Big Manistee River,** entering Manistee Lake at its N end, flows through a flat valley with numerous cutoffs and sloughs, and is crossed by a number of fixed bridges. The channel is tortuous, with depths varying from 1½ to 11 feet to a dam which crosses the river about 30 miles above the mouth.

(204) **Caution.**–A 140-foot barge, partially submerged in 18 feet of water, is about 300 yards **265°** from Manistee South Pierhead Light.

(205) **Bridges.**–Maple Street bridge, about 1.1 miles above the mouth of Manistee River, has a bascule span with a clearance of 23 feet. U.S. Route 31 bridge, 1.4 miles above the mouth, has a bascule span with a clearance of 32 feet. The CSX railroad bridge, 1.5 miles above the mouth, has a swing span with a clearance of 13 feet. (See **33 CFR 117.1 through 117.59 and 117.637,** chapter 2, for drawbridge regulations.) An overhead power cable at the head of the river has a clearance of 145 feet.

(206) **Manistee Coast Guard Station,** seasonally operated, is on the N side of the entrance to Manistee Harbor.

(207) **Harbor regulations.**–Harbor regulations have been established by the city of Manistee and are enforced by the **harbormaster.** Copies of regulations may be obtained from the Chief of Police at City Hall. A **slow-no wake speed** is enforced in the Manistee River. Federal regulations specify an 8 mph (7 knots) **speed limit** for vessels over 40 feet in length. (See **33 CFR 162.120,** chapter 2, for regulations.)

(208) **Wharves.**–Manistee has several deep-draft facilities. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

(209) **Sievert Brothers, Inc. Wharf:** S side of the head of Manistee River; 850-foot face; 12 to 21 feet alongside; deck height, 8 to 9 feet; open storage for 80,000 tons of material; receipt of sand, gravel, limestone, and coal; shipment of salt; owned and operated by Sievert Brothers, Inc.

(210) **Morton Salt Co. Coal Dock:** (44°14′36″N., 86°18′29″W.); deck height, 3 feet; self-unloaders lay off dock and discharge by boom; receipt of coal; owned and operated by Morton Salt Division, Morton-Norwich Products.

(211) **Morton Salt Co. Dock:** across slip S of Coal Dock; 250-foot face; covered storage for 12,000 tons of salt; shipment of salt; owned and operated by Morton Salt Division, Morton-Norwich Products.

(212) **Hardy Salt Co. Dock:** (44°13′51″N., 86°18′06″W.); about 800 feet of berthing space; 15 to 18 feet alongside; deck height, 4 feet; open storage for 40,000 tons of coal; receipt of coal; owned and operated by Hardy Salt Co.

(213) **Packaging Corp. of America Dock:** (44°13′11″N., 83°17′22″W.); 325-foot N side, 24 feet alongside; 344-foot E side, 24 feet alongside; 370-foot S side, 23 feet alongside; shipment of machinery and bulk cargoes; owned by Packaging Corp. of America and operated by various operators.

(214) **Small-craft facilities.**–A public dock constructed by the Michigan State Waterways Commission is on the S side of the Manistee River just inside the mouth. There are private marinas on the N side of the river 0.7 mile above the mouth and at the N end of Manistee Lake. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. The marina at the N end of Manistee Lake has a 20-ton marine railway for hull and engine repairs.

(215) **Chart 14907.**–From Manistee SSW for 16 miles to Big Sable Point, the shore is bluff, with a few hills. The 18-foot contour is about 0.4 mile offshore. **Big Sable Point,** 45 miles S of Point Betsie, has a low shoreline with hills rising inland. **Big Sable Light** (44°03.5′N., 86°30.9′W.), 106 feet above the water, is shown from a conical tower, white with middle third and top black, with an attached dwelling on the point.

(216) From Big Sable Point SSE for 7.5 miles to Ludington, the shore is clear to within 0.5 mile. The land in this stretch is generally low, except in the vicinity of Lincoln Lake where the bluffs reach 120 to 180 feet in height. **Big Sable River,** the outlet of Hamlin Lake, flows into Lake Michigan 2 miles S of Big Sable Point. A dam crosses the river about 0.8 mile above the mouth.

(217) **Charts 14907, 14937.–Ludington Harbor** is in Pere Marquette Lake, 7.5 miles S of Big Sable Point. The city of **Ludington, Mich.,** is on the N side of the lake.

(218) **Prominent features.**–Prominent are the lighted stack at Dow Chemical U.S.A., 1.7 miles ESE of the harbor entrance, and Father Marquette Memorial Cross, 1.1 miles SE of the entrance.

(219) **Ludington North Breakwater Light** (43°57.2′N., 86°28.2′W.), 55 feet above the water, is shown from a white square pyramidal tower on the outer end of the N breakwater; a fog signal is at the light.

(220) **Channels.**–A dredged entrance channel leads E from deep water in Lake Michigan between converging breakwaters to an outer harbor basin. The outer ends of the breakwaters are marked by lights. From the basin, the channel leads to the N end of Pere Marquette Lake. The channel is protected by piers and revetments on the N and s sides. The piers are marked at their outer ends by lights,and a fog signal is at the North Pierhead Light.

(221) In July 1997, the controlling depths were 20 feet (25 feet at midchannel) from deep water in Lake Michigan to Pere Marquette Lake. Depths to 20 feet were available in the N outer basin with lesser depths along the edge and depths of 5½ to 20 feet were available in the S outer basin.

(222) The outer basin is not adapted for anchorage of vessels, but reduces wave action in the inner harbor. Mooring to the breakwaters, piers, and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(223) **Pere Marquette Lake** is about 2 miles long, including a marsh at the S end, has an average width of 0.5 mile, and is up to 43 feet deep. The anchorage is good. **Pere Marquette River,** which flows into the S end of Pere Marquette Lake, is not navigable above the lake except for rowboats and small launches.

(224) A buoy marks the outer end of submerged dock ruins on the W side of Pere Marquette Lake. Buoys mark the N side of the channel leading to the small-craft facilities in the inlet on the NE side of the lake.

(225) **Caution.**–NW and SW winds make entry between the breakwaters hazardous. Vessels usually increase their speed until just inside the breakwaters to compensate. Small-craft operators transiting from S to N have reported that South Breakwater Light is sometimes difficult to see because of the brilliance of North Breakwater Light.

(226) **Bridges.**–A fixed highway bridge with a clearance of 12 feet crosses the inlet on the NE side of Pere Marquette Lake.

(227) **Coast Guard.**–Ludington Coast Guard Station is on the N side of the harbor entrance.

(228) **Harbor regulations.**–A **speed limit** of 8 mph (7 knots) is enforced when entering or leaving Ludington Harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) A **slow-no wake speed** is enforced on Pere Marquette River.

(229) **Wharves.**–Ludington has five deep-draft facilities. (For complete information on the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

(230) **Laman Asphalt and Paving Co. Wharf:** (43°57′04″N., 86°27′08″W.); 900-foot face; 23 feet alongside; deck height, 7 feet; open storage for 45,000 tons of stone; receipt of stone and construction aggregates; owned by Chessie System and operated by Laman Asphalt and Paving Co., Inc., and C-way Construction Co.

(231) **Western Concrete Products Co. Wharf:** (43°56′49″N., 86°26′27″W.); 430-foot face; 18 feet alongside; bank height, 0 to 3 feet; open storage for 40,000 tons of stone; receipt of sand and stone; owned by J.P. Burroughs and operated by Western Concrete Products Co.

(232) **Dow Chemical, West Wharf:** (43°56′28″N., 86°26′30″W.); 1,500-foot face; 30 feet alongside; deck height, 3½

feet; open storage for 400,000 tons of limestone; receipt of limestone; owned and operated by Dow Chemical U.S.A.

(233) **Dow Chemical, East Wharf:** (43°56′20″N., 86°26′23″W.); 550-foot face; 30 feet alongside; deck height, 3½ feet; receipt and shipment of petroleum products; shipment of liquid calcium chloride; owned and operated by Dow Chemical U.S.A.

(234) **Sand Products Corp. Dock:** 0.3 mile SW of Dow Chemical, West Wharf; 750 feet of berthing space along dolphins; 27 feet alongside; deck height, 5 feet; open storage for 24,000 tons of material; shipment of sand; owned by Dow Chemical U.S.A. and operated by Sand Products Corp.

(235) **Small-craft facilities.**–A marina developed by the Michigan State Waterways Commission is on the N side of Pere Marquette Lake, N of Car Ferry Slip No. 1 and private marinas are in the NE arm of Pere Marquette Lake. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, launching ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. A 20-ton hoist and marine railways to 30 tons are available. Hull and engine repairs are available at the N end of the lake near the entrance.

(236) **Ferries.**–Ferry service is available from Ludington to Kewaunee throughout the year for railcars, autos, and passengers. The terminal is about 1 mile SE of the harbor entrance.

(237) **Chart 14907.**–From Ludington S for 12 miles to Pentwater, the shore is bluff, with hills reaching 150 to 250 feet high. The shoal border is regular, and there are no outlying dangers. At the Ludington Pumped Storage Hydroelectric Plant, 4 miles S of Ludington, two jetties extend from shore and are attached by log booms to a detached breakwater. These structures are marked by private lighted buoys, and navigation should not be attempted close to them. The outlet of **Bass Lake,** 8.5 miles S of Ludington, is blocked by a dam at the Lake Michigan shoreline, and its water level is about 3 feet above Low Water Datum.

(238) **Pentwater Harbor,** serving the town of **Pentwater, Mich.,** is in Pentwater Lake, 20 miles S of Big Sable Point. Pentwater Lake is connected to Lake Michigan by a dredged entrance channel.

(239) **Channels.**–The dredged channel leads from deep water in Lake Michigan SE between piers and revetments to the N end of Pentwater Lake. In 1994-April 1998, the controlling depth was 11 feet. The outer ends of the piers are marked by lights. In April 1998, the corner entrance of the entrance channel off the N pier had shoaled to 6 feet and was marked by a buoy. Currents in the channel attain velocities up to 3 mph in either direction.

(240) Mooring to the piers and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(241) **Pentwater Lake,** about 2 miles long and 0.5 mile wide with depths of 25 to 50 feet, provides good anchorage. **Pentwater River,** at the head of the lake, has depths of 1 foot and is crossed by a highway bridge at the mouth.

(242) A **slow-no wake speed** is enforced in Pentwater Lake and in the entrance channel. Federal regulations specify an 8 mph (7 knots) **speed limit** for vessels over 40 feet in length. (See **33 CFR 162.120,** chapter 2, for regulations.)

(243) **Small-craft facilities.**–A public dock constructed by the village and the Michigan State Waterways Commission is in the NW part of Pentwater Lake SE of the entrance channel. A private marina is further SE. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, limited marine supplies, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. A 16-ton hoist is available for hull and engine repairs.

(244) From Pentwater Harbor, the shore trends SW for 10 miles to Little Sable Point. This stretch is a continuous line of bluffs with a regular shoal border and several off-lying wrecks. A wreck, covered 18 feet, is 0.5 mile offshore 2 miles SW of Pentwater Harbor, and a wreck, covered 1 foot and marked by a buoy, is close to shore 7 miles SW of the harbor. **Little Sable Point** is a broad rounding point 28 miles S of Big Sable Point. **Little Sable Light** (43°39.0′N., 86°32.4′W.), 108 feet above the water, is shown from a conical red brick tower on the point.

(245) **Charts 14907, 14906.**–From Little Sable Point, the shore trends SSE for 20 miles to White Lake. This stretch is quite rugged, with no shoals beyond 0.5 mile from shore. A wreck, covered ½ foot, is close to shore 0.8 mile S of Little Sable Light.

(246) **Stony Lake,** 6.5 miles S of Little Sable Point has its outlet into Lake Michigan through **Stony Creek.** Rows of old piles at the mouth of the creek are the only remainder of former lumber loading facilities. The creek is not navigable.

(247) **Chart 14906.**–About 4 miles S of Stony Lake, several hills from 125 to 245 feet high are along the shore.

(248) **Charts 14906, 14935.–White Lake,** about 20 miles SSE of Little Sable Point, is separated from Lake Michigan by a narrow strip of sandy bluffs. A dredged cut affords access between the lakes. The towns of **Montague, Mich.,** and **Whitehall, Mich.,** are at the NE end of White Lake about 4 miles above the cut.

(249) **Channels.**–The dredged entrance channel leads from deep water in Lake Michigan between parallel piers and revetments to the W end of White Lake. The outer ends of the piers and the inner end of the S pier are marked by lights. The outer end of the channel between the piers is subject to extensive shoaling. In August 1997, the controlling depth was 11 feet between the piers and revetments to White Lake. Currents in the channel attain velocities up to 3 mph in either direction.

(250) Mooring to the piers and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

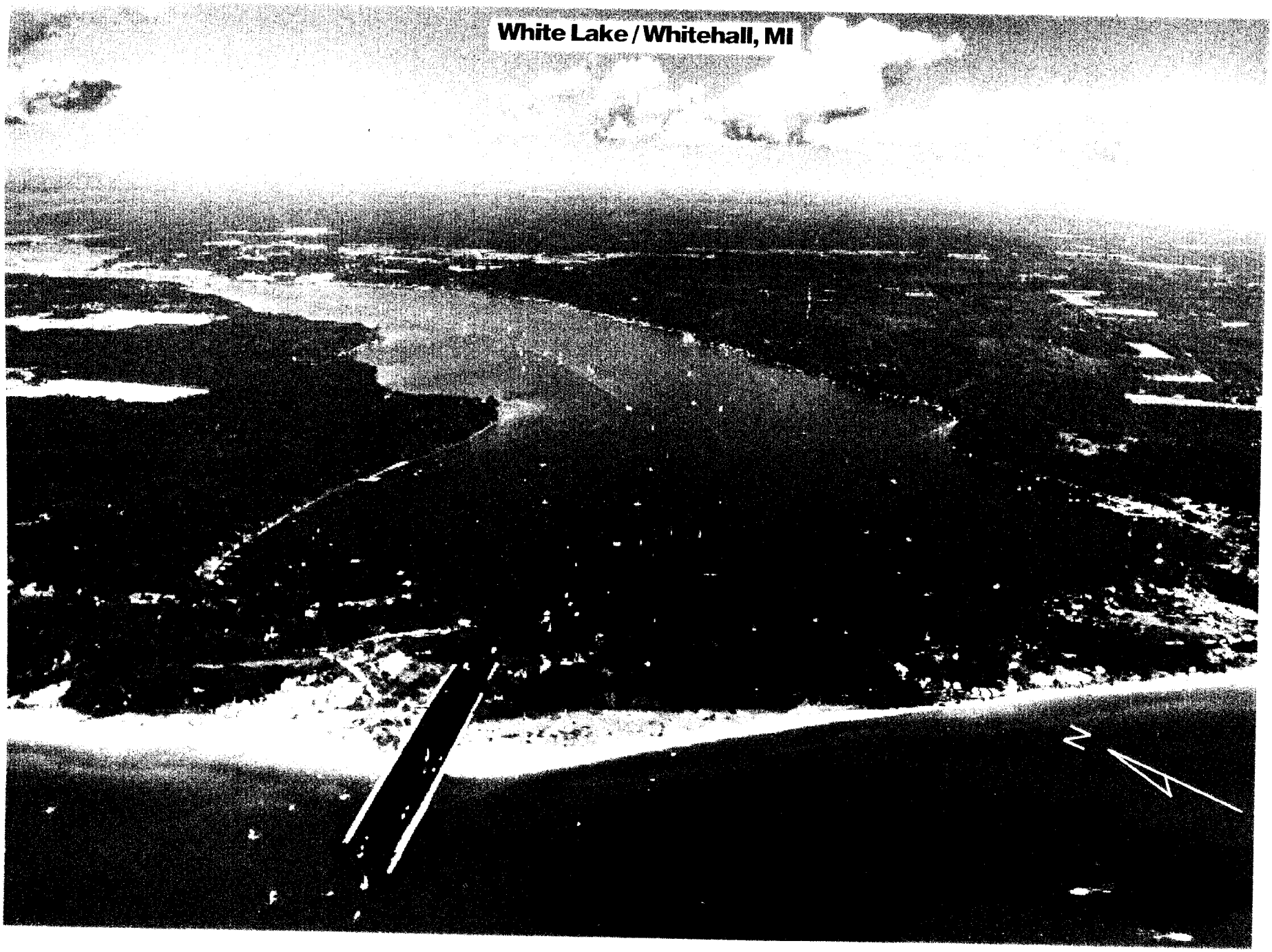
(251) In White Lake, at the inner end of the dredged channel, the channel bends SE around the shoal off **Indian Point.** The S edge of the shoal is marked by lighted buoys. The lake has central depths of 25 to 70 feet with shoals extending as much as 0.6 mile from shore. Lighted buoys and lights at the outer edges of the shoals mark the deep water through the lake to its head. **White River** flows into the head of the lake between Montague and Whitehall. The bar at the mouth of the river has depths of 2 feet.

(252) **Anchorages.**–The preferred anchorages in White Lake are in the NW end of the bay in the upper part of Indian Bay in depths of 25 to 30 feet, mud bottom; in the SW part of the lake W of the yacht club in 10 to 25 feet, sand bottom; and in the NE end of the lake S and W of the city dock in 8 to 10 feet, mud bottom.

(253) **Bridges.**–A fixed highway bridge and a fixed railroad bridge, with a reported least clearance of 4 feet, cross White River just above the mouth.

(254) A **speed limit** of 8 mph (7 knots) is enforced in White Lake. (See **33 CFR 162.120,** chapter 2, for regulations.)

(255) Hooker Chemicals and Plastics Corp. ships caustic soda from a facility on the N shore of White Lake 2.4 miles ENE of Indian Point. The offshore wharf has a deck height of about 11 feet and provides 150 feet of berthing space along dolphins. The


White Lake / Whitehall, MI
N

reported depth alongside is 20 feet. The facility has tank storage for 1½ million gallons.

(256) **Small-craft facilities.**–

(257) A marina developed by the Michigan State Waterways Commission is at Whitehall. Marinas here and at Montague provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. Hoists to 30 tons and a 15-ton marine railway for boats to 38 feet are available for hull, engine, and electronic repairs.

(258) **Chart 14906.**–From White Lake, the shoreline continues SSE for 11 miles to Muskegon Lake. The shore consists of low sand bluffs and wooded hills, and is clear of shoals to within 0.6 mile.

(259) **Charts 14906, 14934.–Muskegon Harbor,** 31 miles SSE of Little Sable Point, consists of Muskegon Lake and a dredged entrance channel which connects it with Lake Michigan. Facilities for a wide range of commerce are on the S shore of the harbor at the city of **Muskegon, Mich.,** and at its E end.

(260) **Prominent features.**–A lighted stack of the Consumers Power Co. at the mouth of the Muskegon River in 43°15′16″N., 86°14′23″W. is prominent from Lake Michigan. Sandhills N and S of the harbor entrance may obstruct the stack from some directions.

(261) **Muskegon South Breakwater Light** (43°13.5′N., 86°20.8′W.), 70 feet above the water, is shown from a red pyramidal tower on the outer end of the S breakwater; a fog signal is at the light.

(262) **Channels.**–The dredged entrance channel leads from deep water in Lake Michigan between converging breakwaters to an outer basin, thence between piers and revetments to Muskegon Lake. The outer ends of the breakwaters and piers, and the inner ends of piers, are marked by lights. A fog signal is at the light on the S pier. In August 1996, the controlling depths were 21 feet in the S half of the approach and 23 feet in the N half to the ends of the breakwaters thence 27 feet in the outer basin, thence 25 feet (27 feet at midchannel) between the piers and revetments to Muskegon Lake.

(263) Currents in the channel attain velocities up to 3 mph in either direction.

(264) The outer basin is not adapted for anchorage of vessels, but reduces wave action in the entrance channel.

(265) Mooring to the breakwaters, piers, and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap. In 1988, a rock bed, covered 1 foot, was reported 30 feet N of the South Breakwater Light.

(266) **Muskegon Lake** is about 4 miles long and varies from 2 miles wide at the W end to as little as 0.6 mile in the E part. The lake has central depths of 25 to 79 feet. Near midlength of the lake, shoals marked at the outer edges by lights extend from the N and S shores and restrict the available width of deep water to 1,600 feet. There are many obstructions in the shallow parts of the lake, including cribs, pipelines, and submerged pilings and dock ruins.

(267) **Muskegon River** flows into the NE end of Muskegon Lake through two channels. Through the main channel, at a river stage of about 2 feet above extreme low water, depths are 2½ to 9 feet for 33 miles above the mouth to the former dam at **Newaygo, Mich.**. The river is navigable by small craft that can pass under the bridges. The least clearance is 5 feet.

(268) **Bear Lake** parallels the NW side of the NE end of Muskegon Lake and has its outflow through a narrow channel into its N side. **North Muskegon, Mich.,** is the community on the peninsula between the two lakes.

(269) **Anchorage.**–Muskegon Lake affords good anchorage, generally sand or mud bottom. Special anchorages are in the SW part of the lake and on the S side at Muskegon. (See **33 CFR 110.1 and 110.81,** chapter 2, for limits and regulations.)

(270) **Weather, Muskegon and vicinity.**–Muskegon, MI, is located on the east shore of Lake Michigan and in the west-central portion of the state. The location averages about three days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 81°F (27.2°C) and an average minimum of 60°F (15.6°C). January is the coolest month with an average high of 30°F (-1°C) and an average minimum of 18°F (-7.8°C). The highest temperature on record for Muskegon is 99°F (37.2°C) recorded in August 1964 and the lowest temperature on record is -15°F (-26.1°C) recorded in December 1976. About 141 days each year experience temperatures below 32°F (0°C) and an average ten days each year records temperatures below 5°F (-15°C). Every month has seen temperatures below 40°F (4.4°C) except July (extreme minimum is 41°F (5°C)) and every month except July and August has recorded temperatures below freezing (0°C).

(271) The average annual precipitation for Muskegon is 32.56 inches (827 mm) which is fairly evenly distributed throughout the year. Precipitation falls on about 208 days each year. The wettest month is September with 3.32 inches (84 mm) and the driest, February, averages only 1.65 inches (42 mm). An average of 35 thunderstorm days occur each year with June, July and August being the most likely months. Snow falls on about 93 days each year and averages about 104 inches (2642 mm) each year. January averages nearly 34 inches (864 mm) per year while December averages nearly 27 inches (686 mm) each year. One-foot (305 mm) snowfalls in a 24-hour period have occurred in each month December, January, February and April. About 24 days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June, July, and August. Fog is present on average 140 days each year and is rather evenly distributed throughout the year with a slight maximum during the late summer and early autumn.

(272) The prevailing wind direction in Muskegon is the west-northwest. Late winter through spring is the windiest period but a maximum gust of 58 knots occurred in February 1987.

(273) (See page T-10 for **Muskegon climatological table.**)

(274) Muskegon is a **customs port of entry.**

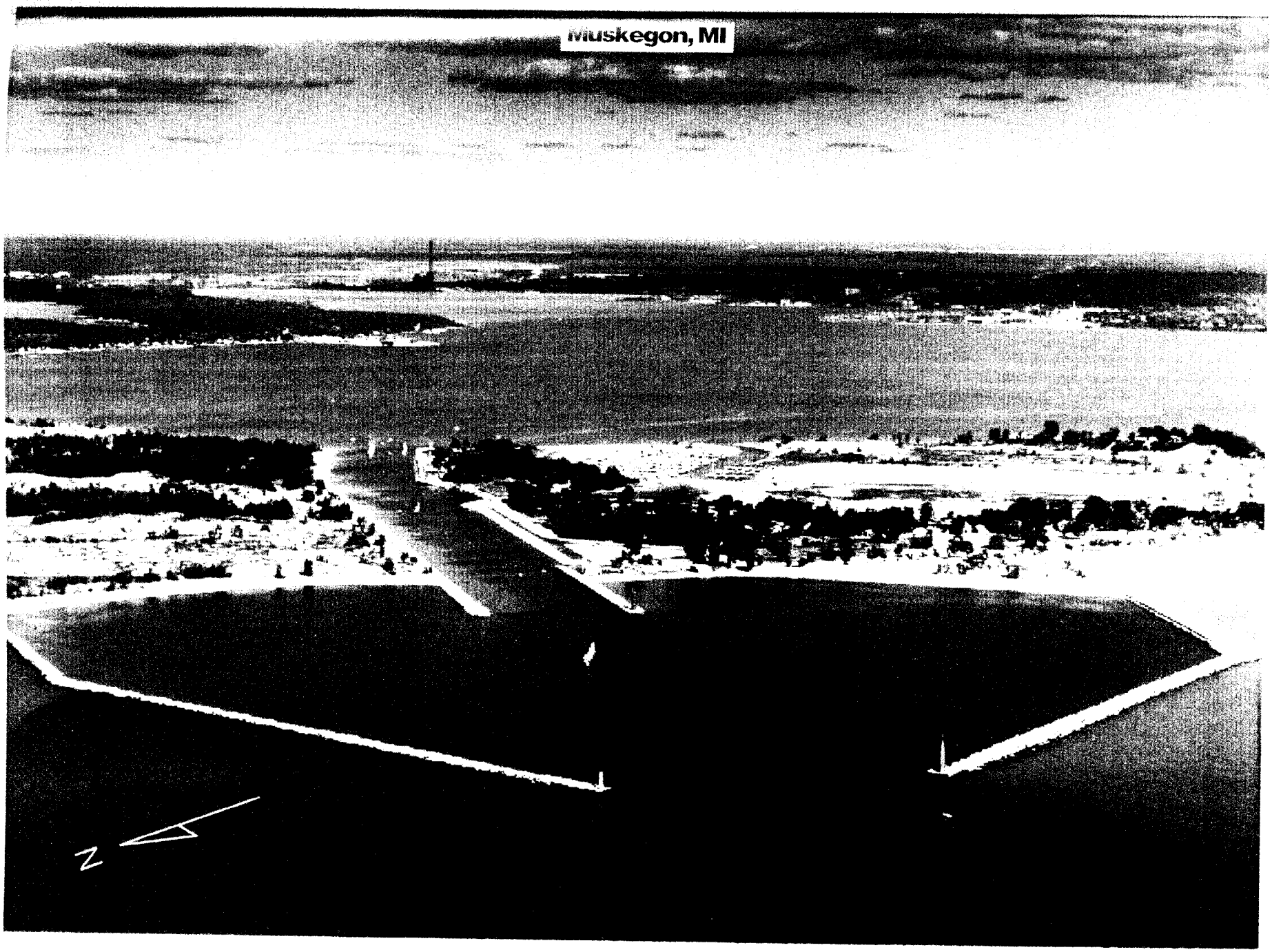
(275) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(276) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(277) **Coast Guard.**–Muskegon Coast Guard Station is on the S side of the harbor entrance channel.

(278) **Harbor regulations.**–A **speed limit** of 8 mph is enforced in Muskegon Harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) A **slow-no wake speed** is enforced in the Bear Lake entrance channel.

(279) **Wharves.**–Muskegon has numerous deep-draft facilities along the S shore of Muskegon Lake. (For a complete description of the port facilities, refer to Port Series No. 48, published and


Muskegon, MI
N

sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operators.)

(280) **S. D. Warren Co., Central Mill Coal Slip:** (43°13′00″N., 86°18′29″W.); 500-foot faces, E and W sides; 24 feet alongside; natural bank height, 4 to 5 feet; open storage for 255,000 tons of material; receipt of limestone and coal; owned and operated by S. D. Warren Co.

(281) **Great Lakes Dock and Materials Co. Pier:** (43°13′20″N., 86°17′27″W.); 450-foot N side, 650-foot E side, along mooring dolphins; 25 feet alongside; deck height, 9 feet; open storage for 100,000 tons of material; receipt of limestone and other bulk materials; owned by John H. Bultema and operated by Great Lakes Dock and Materials Co.

(282) **Lafarge Corp. Pier:** (43°14′02″N., 86°15′40″W.); 529-foot face, 555 feet with dolphins; 19 to 23 feet alongside: deck height, 6 feet; storage silos for 12,000 tons of cement; receipt of bulk cement; owned and operated by Lafarge Corp.

(283) **Brand Utilities Dock:** across slip E of Huron Cement Pier; 540 feet of berthing space with dolphins; 18 to 22 feet alongside; deck height, 8 feet; receipt and shipment of construction materials; owned and operated by Brand Utilities Co.

(284) **West Michigan Dock and Market Corp., Northwest Dock:** 0.3 mile N of Lakeshore Contractors Dock; 930-foot W face, berths 3 and 4; 420-foot NW face, berth 5; 21 to 30 feet alongside; deck heights, 6 and 5 feet; 74,000 square feet covered storage; 5 acres open storage; 15-ton gantry crane; receipt of limestone, pig iron, and dry bulk commodities and shipment of scrap metal; owned and operated by West Michigan Dock and Market Corp.

(285) **West Michigan Dock and Market Corp., Northeast Dock:** W side of slip adjacent to Northwest Dock, berth 5; 784-foot face; 27 feet alongside; deck height, 6 feet; 57,000 square feet covered storage; receipt of limestone, pig iron, and dry bulk materials; owned and operated by West Michigan Dock and Market Corp.

(286) **B. C. Cobb, Power Plant Wharf:** N side of mouth of Muskegon River; 1,380 feet of berthing space along dolphins; 26 to 33 feet alongside; deck height, 8½ feet; 22 acres open storage; receipt of coal; owned and operated by Consumers Power Co.

(287) **Small-craft facilities.**–Public docking facilities are available midlength of the S lakeshore at the Hartshorn Municipal Marina, jointly constructed by the city and the Michigan State Waterways Commission. A private marina is on the N shore at the outlet of Bear Lake. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, limited marine supplies, launching ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. A 30-ton mobile hoist is available for engine repairs, and limited hull and electronic repairs.

(288) **Communications.**–Muskegon has good highway and rail connections. The city is served by Muskegon County Airport S of the city.

(289) **Chart 14906.**–From Muskegon, the shore extends SSE for 12.5 miles to Grand Haven. The N 5 miles of this reach has hills to 205 feet high; the remainder of the stretch is lower. Deep water is about 0.5 mile offshore. Two unmarked fish havens are about 0.5 mile S of the Muskegon Harbor entrance.

(290) **Mona Lake,** a small body of water 4.8 miles S of Muskegon, has several summer resorts and is used by small recreational craft. This narrow lake is about 3.5 miles long with general depths of 18 to 40 feet. It empties into Lake Michigan through a slightly winding channel at the W end. In 1971, the controlling depth in the channel was 3 feet, but it is at times entirely closed by sandbars. The ruins of two piers protect the entrance. The N pier is almost entirely washed away, and the S pier is gone except for a double row of piles extending from a point 50 feet out in the lake to a point about 450 feet inside. The banks rise steeply from each shore.

(291) A highway bridge with a 29-foot draw span and a clearance of 12 feet crosses the inner end of the entrance channel. In 1978, it was reported that the bridge was being maintained in the closed position. A fixed highway bridge with a clearance of 18 feet crosses the lake 1.5 miles farther E.

(292) A **slow-no wake speed** is enforced in Mona Lake. A restricted navigation area for motorboats is within 100 feet of shore for 1,025 feet E of the W bridge.

(293) **Charts 14906, 14933.–Grand Haven, Mich.,** is a city and harbor on the **Grand River,** 43 miles S of Little Sable Point. The towns of **Ferrysburg, Mich.,** and **Spring Lake, Mich.,** front the N side of the river. These communities are not visible from Lake Michigan because of sand dunes and hills immediately N and S of the harbor entrance. The principal commodities handled in the port are coal and sand.

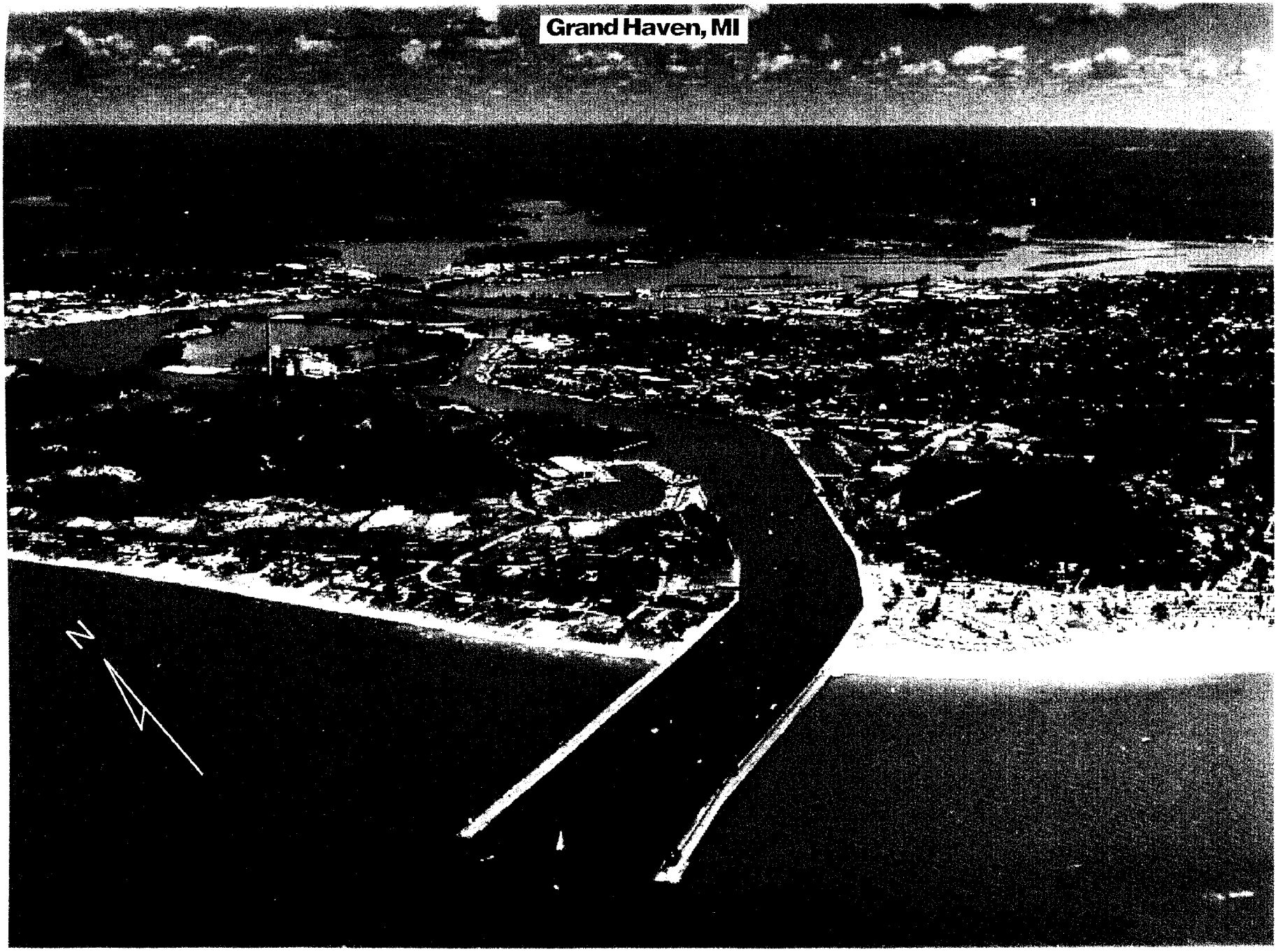
(294) **Grand Haven South Pierhead Entrance Light** (43°03.5′N., 86°15.4′W.), 42 feet above the water, is shown from a red fog signal building on the outer end of the S pier; a fog signal is at the light.

(295) **Channels.**–The dredged entrance channel leads E from deep water in Lake Michigan between parallel piers at the mouth of Grand River and upstream for about 16 miles. The outer ends of the piers are marked by lights. South Pierhead Entrance Light and an inner light on the S pier form a range useful for approaching the harbor. There is a turning basin on the S side of the channel 2.3 miles above the mouth, and 2.7 miles above the mouth a side channel extends N to the deep water in Spring Lake. In March-June 1995, the controlling depth was 23 feet in the approach channel; thence 14 feet (21 feet at midchannel) to the municipal marina 1.0 mile above the mouth of the river; thence 8½ feet (21 feet at midchannel) to the railroad bridge at Ferrysburg, thence 11 to 15 feet in the turning basin; thence in 1978, 15 feet from the railroad bridge to the entrance channel to Spring Lake; thence in June-July 1980, 12 feet into Spring Lake; thence in October 1997, 4 feet from the Spring Lake channel to the C-Way Construction Co. gravel pits at Bass River. The channel limits from Ferrysburg to the upstream project limit are well marked by buoys. The channels are subject to shoaling.

(296) Large riprap stones have been placed along the lakesides and ends of the piers, and navigation should not be attempted close to these structures. Mooring to the piers or revetments is prohibited.

(297) The Grand River is not maintained above the junction with Bass River. Conditions are unknown, but depths probably do not exceed 2 to 3 feet at extreme low water for 23.5 miles upstream to Grand Rapids. Only small recreational craft navigate this section of the river.

(298) The lower part of Grand River has connecting shallow side channels separated from the main river by low marshy islands. Several connected bayous, or bays, have very shallow entrances with deep water inside. **South Channel,** the farthest downstream of the side channels, cuts across a bend in the river between points about 1.2 and 3.3 miles above the mouth and has a controlling depth of 3 feet.


Grand Haven, MI
N

(299) **Spring Lake,** extending N and connected to the Grand River at Ferrysburg, has depths of 19 to 42 feet except for shoaler depths at its head.

(300) **Danger.**–The J.B. Sims Power Plant is on Harbor Island. Intake pipes on the W side of the island in the intake mode pose no threat to watercraft. The intakes have a compressed air blowback system to clear the screens. This blowback is capable of capsizing a small recreational vessel. The area is surrounded by rope barriers and is marked by signs.

(301) **Currents.**–High-water periods on the Grand River are usually for two months during the spring. During these periods, currents may reach 3 to 5 mph. periods, currents may reach 3 to 5 mph. Currents up to 5 mph should be expected after periods of heavy precipitation, regardless of season.

(302) Grand Haven is a **customs station.**

(303) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(304) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(305) **Grand Haven Coast Guard Station** and a **Marine Safety Detachment** office are on the S side of the harbor entrance. (See appendix for address of the Detachment.)

(306) **Harbor regulations.**–Federal regulations specify a **speed limit** of 8 mph (7 knots) in Grand Haven harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) State regulations specify a **slow-no wake speed** on the following waters: in Grand River, from the mouth to the junction with South Channel, from 3,200 feet below to 1,000 feet above the CSX railroad bridge, within 200 feet of the N shore from the junction with Spring Lake E for 4,000 feet, within 300 feet of the S shore from the junction with Spring Lake to the upper junction with South Channel, from the confluence with Indian Channel upstream for 3,500 feet, in the river bend in the vicinity of Millhouse Bayou, and for a stretch of 4,000 feet in the vicinity of Grand Valley Marina about 12 miles above the river mouth; in South Channel; in Pottawattomie Bayou; in Millhouse Bayou; in the entrance to Spring Lake; in Spring Lake, adjacent to the towns of Ferrysburg and Spring Lake for vessels 26 feet in length or more, and within 200 feet of shore of these towns for vessels less than 26 feet in length; in Smith Bayou; in Pettys Bayou; in Cornelius Bayou; and in Stahl Bayou.

(307) Local harbor regulations are under the control of the city manager and enforced by the **harbormaster.** Copies of the regulations can be obtained from the City Manager, City Hall, 519 Washington Street, Grand Haven, Mich. 49417.

(308) **Wharves.**–Grand Haven has several deep-draft facilities in the lower 2 miles of Grand River. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.)

(309) **J.B. Sims Power Plant Dock:** E side of river just above junction with South Channel; 437-foot face; 17 feet alongside; deck height, 6 feet; open storage for 70,000 tons of coal; receipt of coal; owned and operated by City of Grand Haven, Board of Light and Power.

(310) **Construction Aggregates Corp. Wharf:** W side of river 0.5 mile above South Channel; 350 feet of berthing space along dolphins; 20 feet alongside; deck height, 7 feet; vessel loading conveyor, rate 3,200 tons per hour; shipment of sand; owned and operated by Construction Aggregates Corp.

(311) **Verplanks Coal and Dock Co. Wharf:** N side of river 0.5 mile above Construction Aggregates Corp. Wharf; 2,200 feet of natural and improved bank; 21 feet alongside; deck height, 4 feet; open storage for 200,000 tons of material; receipt of coal and bulk aggregates; owned by Verplanks Coal and Dock Co. and operated by Verplanks Coal and Dock Co. and Grand Haven Materials Terminal.

(312) **Small-craft facilities.**–Grand Haven has numerous small-craft facilities along both sides of Grand River, in South Channel, and in Spring Lake. The public docking facility, constructed by the city and the Michigan State Waterways Commission, is on the E side of the river just below the junction with South Channel. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, launching ramps, and harbormaster services are available in the harbor. The harbormaster monitors VHF-FM channels 16 and 9. Lifts to 50 tons are available for hull and engine repairs.

(313) **Chart 14906.**–From Grand Haven, the shore trends S for 11 miles to Port Sheldon. This stretch is partially wooded with rolling terrain and several hills in the N part 140 to 200 feet high. There is deep water within 0.5 mile of the shore.

(314) **Port Sheldon** is a small harbor in **Pigeon Lake** 55 miles S of Little Sable Point. Pigeon Lake is connected to Lake Michigan by a entrance channel constructed by Consumers Power Co. The channel is protected by two piers, each marked at the outer end by a private light. The primary purpose of the channel is to provide cooling water for the powerplant on the N side of the lake. In 1978, the reported controlling depth in the channel was 8 feet. Mariners entering the harbor do so at their own risk and are requested not to dispose of waste in Pigeon Lake. There are no public small-craft facilities in the lake. A **slow-no wake speed** is enforced in the lake. A 650-foot white stack and a lighted 400-foot red and white banded stack at the Consumers Power Co. on the N side of Pigeon Lake are prominent.

(315) From Port Sheldon, the shore trends S for 8.8 miles to the Holland Harbor entrance. Sand bluffs are close to shore, and deep water is within 0.5 mile of shore.

(316) **Charts 14906, 14932.–Holland Harbor,** 63 miles S of Little Sable Point, is formed by **Lake Macatawa,** which is connected to Lake Michigan at its W end by an improved channel. The lake extends 5 miles E to its head at the mouth of **Macatawa River** and has a least width of 1,000 feet near its midlength. The width increases to over 1 mile in the vicinity of **Big Bay** and **Pine Creek Bay,** two large indentations in the N shore of the lake. The city of **Holland, Mich.,** fronts the E shore and much of the S shore of the lake. **Macatawa, Mich.,** is a small resort community on the SW side of the lake. The principal commodities handled in the port are coal, salt, cement, stone, and agricultural chemicals.

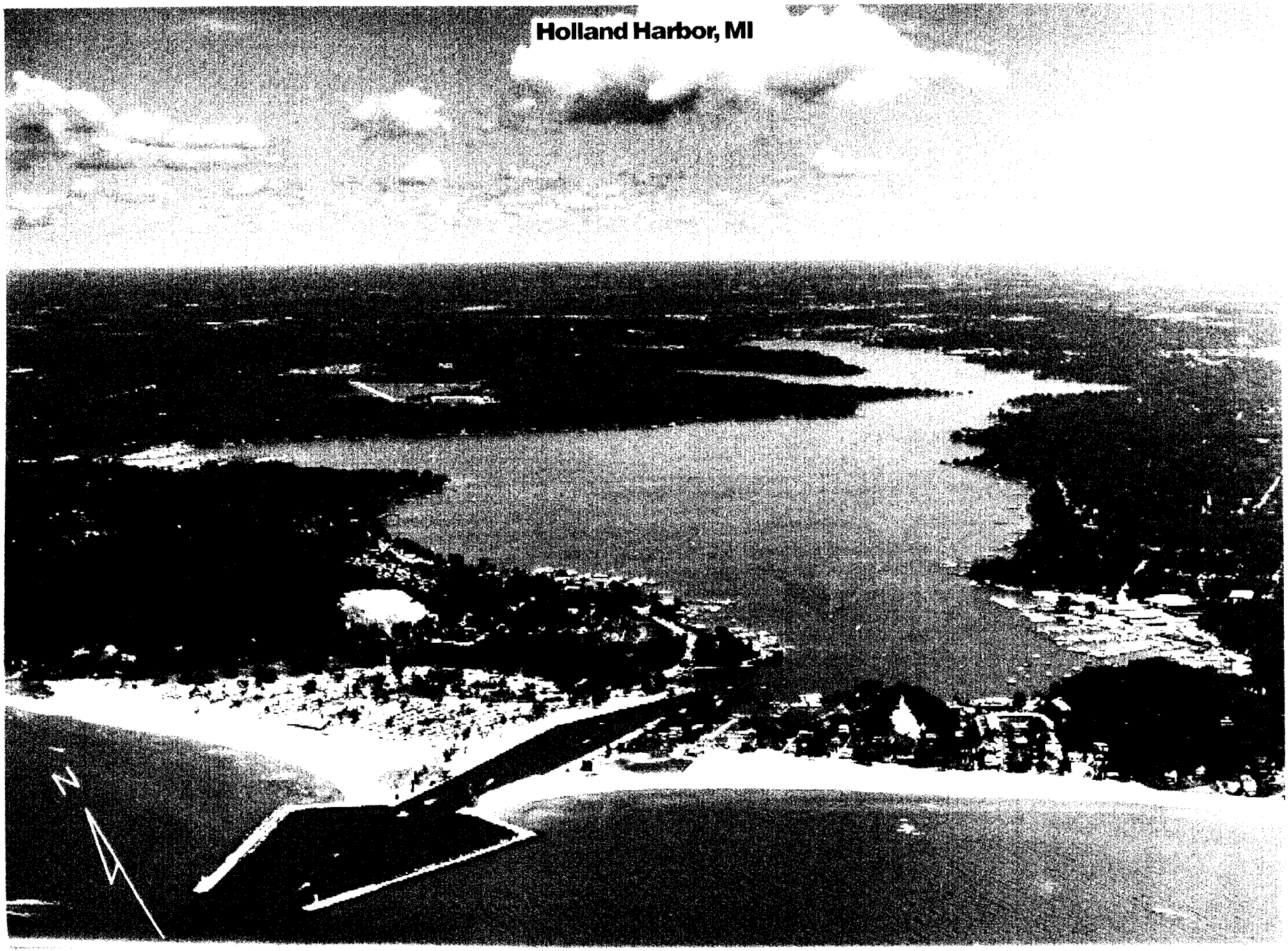
(317) **Holland Harbor North Breakwater Light** (42°46.4′N., 86°12.9′W.), 27 feet above the water, is shown from cylindrical tower with a square green daymark on the outer end of the breakwater.

(318) **Channels.**–The dredged entrance channel leads from deep water in Lake Michigan between converging breakwaters and through a revetted channel to Lake Macatawa. The outer and inner ends of the breakwaters are marked by lights. The channel, well marked by buoys, continues across the lake to a turning basin off Holland at the E end of the lake. From the NE side of the basin, the channel leads into the mouth of Macatawa River. Lights mark the outer edges of shoals that extend from shore into the lake.

## Structures across Grand River to Grand Rapids
### **Miles above South Pierhead Entrance Light*
### ***Clear width in feet proceeding upstream*

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Main Channel** | | | | | | | |
| | Junction with South Channel | | 1.38 | | | | | |
| 1 | CSX Transportation, Inc bridge | Railroad | 2.80 | 60 | 61 | | 9 | Swing. Note 1. |
| 2 | U.S. Route 31 bridge | Highway | 2.89 | | | 155 | 25 | Bascule. Note 1. |
| 3 | Overhead cable | Power | 2.94 | | | | 133 | |
| | Junction with mouth of Spring Lake | | 3.04 | | | | | |
| 4 | Overhead cable | Power | 6.45 | | | | 90 | |
| 5 | Overhead cable | Power | 12.60 | | | | 80 | |
| | Junction with Bass River | | 17.38 | | | | | |
| 6 | Overhead cable | Power | 17.40 | | | | 53 | |
| 7 | Overhead cable | Power | 19.39 | | | | 74 | |
| 8 | 68th Ave. bridge | Highway | 19.40 | 76 | 76 | 76 | 22 | Fixed. |
| 9 | Bridge St. Rd. bridge | Highway | 25.20 | 85 | 85 | | 19 | Fixed. |
| 10 | Overhead cable | Power | 25.21 | | | | 39 | |
| 11 | Grandville bridge | Highway | 33.90 | 69 | 69 | | 24 | Fixed. |
| 12 | Overhead cable | Power | 37.20 | | | | 43 | |
| 13 | ConRail bridge | Railroad | 37.20 | | 54 | | 17 | Swing. Note 2. |
| 14 | Overhead cable | Power | 39.22 | | | | 40 | |
| 15 | Overhead cable | Power | 39.26 | | | | 50 | |
| 16 | Overhead cable | Power | 39.31 | | | | 80 | |
| 17 | Overhead cable | Power | 39.33 | | | | 40 | |
| 18 | Overhead cable | Power | 39.36 | | | | 80 | |
| 19 | Overhead cable | Power | 39.48 | | | | 80 | |
| 20 | Overhead cable | Power | 39.50 | | | | 70 | |
| 21 | Michigan Ry. bridge | Railroad | 39.50 | 70 | 70 | | 27 | Swing. Navigable channel through right draw. Note 2. |
| 22 | Overhead cable | Power | 39.52 | | | | 70 | |
| 23 | Overhead cable | Power | 39.79 | | | | 59 | |
| 24 | Wealthy St. bridge | Highway | 39.80 | | 70 | | 19 | Swing. Note 2. |
| 25 | CSX Transportation, Inc. bridge | Railroad | 39.90 | | 70 | | 19 | Swing. Note 2. |
| 26 | Fulton St. bridge | Highway | 40.00 | | | | | Head of navigation. |
| | **South Channel** | | | | | | | |
| | Junction with Main Channel | | 1.38 | | | | | |
| 27 | Overhead cable | | 1.83 | | | | | Data not available. |
| 28 | Third St. bridge | Highway | 1.84 | | | 23 | 9 | Fixed. |
| 29 | Overhead cable | | 1.85 | | | | | Data not available. |
| 30 | Overhead cable | | 1.92 | | | | | Data not available. |
| 31 | Overhead cable | | 2.00 | | | | | Data not available. |
| 32 | CSX Transportation, Inc bridge | Railroad | 2.01 | | | | 9 | Fixed. |
| 33 | Overhead cables | | 2.16 | | | | | Data not available. |
| 34 | U.S. Route 31 bridge | Highway | 2.25 | | | | 17 | Fixed. |
| 35 | Overhead cable | Power | 2.26 | | | | 49 | |
| 36 | Overhead cable | | 2.32 | | | | | Data not available. |
| | Junction with Main channel | | 2.87 | | | | | |
| | **Spring Lake Channel** | | | | | | | |
| | Junction with Main channel | | 3.04 | | | | | |
| 37 | Route 104 bridge | Highway | 3.15 | | | 111 | 35 | Fixed. |
| 38 | Overhead cable | Power | 3.21 | | | | 113 | |

Note 1.—See 33 CFR 117.1 through 117.59 and 117.633, chapter 2, for drawbridge regulations.
Note 2.—See 33 CFR 117.1 through 117.49, chapter 2, for drawbridge regulations.


Holland Harbor, MI
N

(319) In May 1996, the controlling depths were 15 feet (22 feet at midchannel) in the approach channel; thence in October 1991-March 1993, 19 feet (21 feet at midchannel) in the outer basin and between the piers to Lake Macatawa; thence in October 1991-October 1993, 15 feet in the N half, 17 feet in the S half, and 19 feet at midchannel in the channel through Lake Macatawa to the turning basin with 14 to 18 feet in the N section and 19 feet in the S section of the basin; thence in April 1991-May 1993, 5½ feet (11 feet at midchannel) to the head of the Federal project.

(320) A dredged settling basin extends 700 feet upstream from the upper limit of the project in Macatawa River. In November 1986, the basin had depths of 11 to 17 feet in the lower half and 5 to 17 feet in the upper half. Dredging disposal areas are in Macatawa River from 0.5 mile above the settling basin upstream to Windmill Island.

(321) The currents in the entrance channel attain velocities up to 3 mph in either direction. Mooring to the breakwaters and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(322) Outside the dredged channel, the W end of Lake Macatawa has central depths of 15 to 36 feet with much shoaler water extending from shore. In the E end of the lake, depths are 7 to 16 feet with shoals along the shore. Shoals with depths of 1 to 3 feet extend from shore on either side of the entrance to Big Bay. The S limit of the E shoal is marked by a light. Buoys mark the channel into Big Bay between the shoals. A light marks the extent of a shoal off the S shore opposite Big Bay, and a light marks a shoal off Superior Point, on the N shore at the constriction of the lake.

(323) **Anchorage.**–Pine Creek Bay affords good anchorage for small craft in mud bottom. A special anchorage is in the SW part of Lake Macatawa. (See **33 CFR 110.1 and 110.80a,** chapter 2, for limits and regulations.)

(324) **Holland Coast Guard Station** is on the N side of Lake Macatawa near the harbor entrance.

(325) **Harbor regulations.**–Federal regulations specify a **speed limit** of 8 mph (7 knots) in Lake Macatawa. (See **33 CFR 162.120,** chapter 2, for regulations.) State regulations specify a **slow-no wake speed** off Central Park near midpoint of the lake, off Kollen Park at the E end of the lake, and from the mouth of Macatawa River upstream to a point 1,500 feet above the River Avenue bridge.

(326) **Towage.**–Tugs for Holland are available from Calumet (South Chicago) Harbor. (See Towage under Calumet (South Chicago) Harbor.)

(327) **Wharves.**–Holland has several deep-draft facilities. The longside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.)

(328) **Verplanks Coal and Dock Co. Dock:** (42°47′25″N., 86°07′15″W.); 200-foot W section along dolphins, 350-foot E section; 21 feet alongside; deck height, 4 feet; 6 acres open storage; receipt of limestone, salt, and slag; owned and operated by Verplanks Coal and Dock Co.

(329) **Penn-Dixie Industries, Inc. Wharf:** immediately E of Verplanks Coal and Dock Co. Dock; 260-foot face; 18 feet alongside; deck height, 5 feet; storage silos for 6,600 tons of concrete; electrical connections; receipt of bulk cement; owned and operated by Cement Division, Penn-Dixie Industries, Inc.

(330) **Macatawa Bay Dock and Terminal Co. Wharf:** immediately NE of Penn-Dixie Industries, Inc. Wharf; 850-foot face; 21 feet alongside; deck height, 6 feet; cranes to 50 tons; 30 acres open storage; water connections; receipt and shipment of scrap iron, receipt of pig iron; owned by Louis Padnos Iron and Metal Co. and operated by Macatawa Bay Dock and Terminal Co. and Louis Padnos Iron and Metal Co.

(331) **James DeYoung Municipal Power Plant Dock:** adjacent NE of Macatawa Bay Dock and Terminal Co. Wharf; 850-foot face; 19 feet alongside; deck height, 6 to 7 feet; 3 acres open storage; receipt of coal; owned and operated by Holland Municipal Light and Power Co.

(332) **Brewers City Dock, Inc.:** adjacent NE of James DeYoung Municipal Power Plant Dock; 759-foot face; 19 feet alongside; 5 acres open storage; receipt of limestone, agricultural lime, slag, salt, and potash; owned and operated by Brewers City Dock, Inc.

(333) **Small-craft facilities.**–There are numerous marinas throughout Lake Macatawa. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, and launching ramps are available. Several lifts to 60 tons are available for hull, engine, and electronic repairs.

(334) **Chart 14906.**–From Holland Harbor S for 7 miles to the mouth of the Kalamazoo River, the shore is low bluffs and occasional hills 100 to 250 feet high. Deep water is within 0.5 mile of shore. A sunken barge and crane is in 35 feet of water 0.6 mile offshore 3.8 miles S of Holland. Depth over the wreck is unknown.

(335) **Saugatuck Harbor,** 70 miles S of Little Sable Point, is formed by a dredged entrance channel and the lower part of the **Kalamazoo River.** The dredged entrance is 0.75 mile N of the original natural river mouth. A radar dome on Mount Baldhead, about 1 mile S of the entrance, is prominent.

(336) **Channels.**–In its lower 2 miles, the Kalamazoo River is from 200 to 500 feet wide. For the next 0.75 mile, the river widens to 2,000 feet and is known as **Kalamazoo Lake.** At the upper end of the lake, the river narrows again to 500 feet. The village of **Saugatuck, Mich.,** is on the N side of Kalamazoo Lake and the E side of the river below the lake. **Douglas, Mich.,** is a village on the S side of the lake.

(337) The dredged entrance channel leads from deep water in Lake Michigan between parallel piers and revetments through the mouth of Kalamazoo River and thence upstream for about 2.1 miles to Saugatuck at the N end of Kalamazoo Lake. The outer ends of the piers are marked by lights, and the channel is marked by buoys. A fog signal is at the S pierhead light.

(338) In July 1997, the controlling depth was 11 feet in the entrance channel between the piers and revetments to a point about 650 feet above the shoreward end of the piers, thence in 1993, 8 feet (10 feet at midchannel) upstream to Saugatuck. The channel between the piers and revetments must be dredged frequently, as it tends to shoal after storms. Currents in the channel attain velocities up to 3 mph in either direction.

(339) Mooring to the piers and revetments is prohibited.

(340) An 8-foot channel was dredged through the upper part of Kalamazoo Lake in 1965, but in 1978, only a meandering channel remained.

(341) From Saugatuck to Calkins, about 24 miles upstream, the river is from 100 to 150 feet wide and affords, at low water, a narrow and crooked channel for boats drawing not more than 2½ feet. The Allegan Dam at Calkins, does not have a lock, and boats must be portaged around it. The pool above the dam extends to Allegan and has a controlling depth of about 5 feet.

(342) **Caution.**–Submerged pilings of the old piers at the former entrance of the river extend into the lake about 200 feet and are marked by a buoy. Navigation should not be attempted close to these structures.

## Structures across Kalamazoo River to Allegan
### *Miles above the mouth of the river
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 1 | Overhead cables | Power | 2.78 | | | | 25 | |
| 2 | Saugatuck-Douglas bridge | Highway | 2.80 | 58 | 58 | | 17 | Fixed. |
| 3 | I—196 bridge | Highway | 3.35 | | | 72 | 18 | Twin fixed. |
| 4 | CSX Transportation, Inc. bridge | Railroad | 10.80 | 41 | | | 13 | Swing. Note 2. |
| 5 | New Richmond bridge | Highway | 10.90 | 31 | 31 | | 13 | Swing. Note 2. |
| 6 | Allegan Dam bridge | Highway | 26.10 | | | | | Fixed. Note 1. |
| 7 | Huggins bridge | Highway | 33.90 | 42 | 42 | 42 | 8 | Fixed. |
| 8 | CSX Transportation, Inc. bridge | Railroad | 37.50 | 32 | 35 | | 8 | Swing. Note 2. |
| 9 | Allegan bridge | Highway | 37.80 | | | 126 | 19 | Fixed. |

Note 1.—Bridge crosses the dam. Boats must portage around the dam.
Note 2.—See **33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.

(343) **Harbor regulations.**–Federal regulations specify a **speed limit** of 8 mph (7 knots) in Saugatuck Harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) State regulations specify a **slow-no wake speed** from the river mouth upstream to Kalamazoo Lake.

(344) **Small-craft facilities.**–There are several marinas at Saugatuck and at Douglas. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, and launching ramps are available. Hoists to 30 tons can handle 60-foot craft for hull and engine repairs.

(345) **Cable ferry.**–A cable ferry crossing the Kalamazoo River 2 miles above the mouth is propelled by hauling a submerged chain which is worked around a hand capstan on the ferry. Vessels should avoid passing within 30 feet of the bow or stern of the ferry. Passage on its stern is preferred.

(346) From Saugatuck Harbor for 19 miles S to South Haven, the shore is generally bluff with some steep clay banks. A boulder ledge with depths of 24 to 28 feet at the outer edge extends 1 mile offshore from 1.5 to 3.5 miles S of Saugatuck Harbor entrance. S of this area, deep water is within 0.6 mile of shore, but scattered boulders are throughout the stretch, and small craft should keep well clear of the shore.

(347) **South Haven, Mich.,** is a city and harbor at the mouth of the **Black River,** 88 miles S of Little Sable Point. The harbor is a base for recreational craft and local fish tugs. Two lighted radio masts 1 mile NE of the river mouth are prominent.

(348) **South Haven South Pierhead Light** (42°24.1′N., 86°17.3′W.), 37 feet above the water, is shown from a red conical tower on the outer end of the S pier; a fog signal is at the light.

(349) **Channels.**–The dredged entrance channel leads from deep water in Lake Michigan between parallel piers through the mouth of Black River. The outer ends of the piers are marked by lights. In September 1997, the controlling depths were 12 feet in the approach channel, thence 11 feet in the N half and 13 feet in the S half of the channel between the piers, thence 10 feet to the South Haven Municipal Marina, thence 5 feet to the head of the project just below the Dyckman Avenue bridge. Mooring to the piers and revetments is prohibited.

(350) Above the dredged channel, the Black River is navigable by small craft to the vicinity of the fixed highway bridge about 2.6 miles above the entrance.

(351) **Currents.**–Currents in the river attain velocities up to 3 mph.

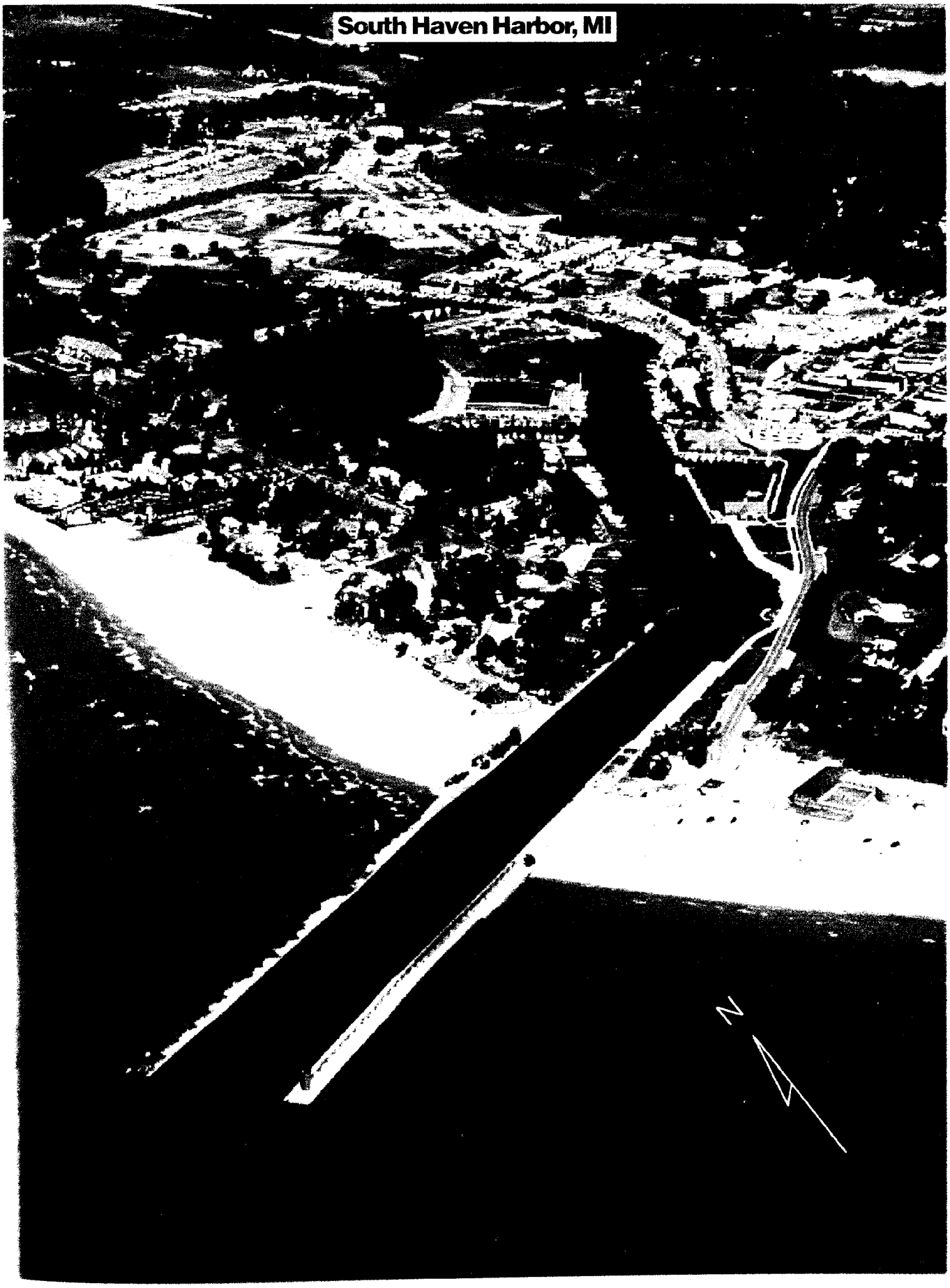
(352) **Bridges.**–A bascule highway bridge with a clearance of 10 feet crosses Black River just above the head of the dredged channel. (See **117.1 through 117.59 and 117.624,** chapter 2, for drawbridge regulations.) An overhead cable with unknown clearance crosses the river 1.9 miles above the entrance. Fixed highway bridges about 2.2 and 2.6 miles above the entrance have clearances of 14 and 36 feet, respectively.

(353) **South Haven Coast Guard Station,** operated on weekends during the boating season only, is on the N side about 300 yards E of the entrance to Black River. A radio guard is usually maintained during daylight hours on holidays and weekends.

(354) **Harbor regulations.**–Federal regulations specify a **speed limit** of 8 mph (7 knots) in South Haven harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) A **slow-no wake speed** is enforced in the harbor.

(355) **Small-craft facilities.**–A public docking facility constructed by the city and the Michigan State Waterways Commission is on the N side of the river 0.5 mile above the mouth. A private marina is adjacent to the public dock and several marinas are above the Dyckman Avenue bridge. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. A 25-ton hoist is available for engine repairs and hull and electronic repairs are available from local firms.

(356) **Chart 14905.**–From South Haven SSW for 22 miles to St. Joseph and Benton Harbor, the shore is skirted by low bluffs for the first 5 miles and higher bluffs in the remainder of the stretch.


South Haven Harbor, MI
N

## Structures across St. Joseph River to Paw Paw River
### *Miles above North Pierhead Light
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **St. Joseph River** | | | | | | | |
| 1 | CSX Transportation, Inc. bridge | Railroad | 0.67 | 91 | 100 | | 12 | Swing. Note 1. |
| 2 | Blossomland (M—63) Bridge | Highway | 0.92 | | | 100 | 36 | Bascule. Note 2. |
| 3 | Overhead cable | | 1.27 | | | | 67 | |
| 4 | Twin Cities Bicentennial Bridge (Main St./I—94 Bus.) | Highway | 1.30 | | | 100 | 19 | Bascule. Note 2. |
| 5 | Overhead cable | Power | 1.52 | | | | 76 | |
| 6 | Napier Ave. bridge | Highway | 3.11 | | | 166 | 28 | Fixed. |
| 7 | Overhead cables | Power | 5.11 | | | | 57 | |
| 8 | Overhead cables | Power | 5.70 | | | | 54 | |
| 9 | I—94 bridge | Highway | 5.90 | 78 | 78 | | 20 | Fixed. 7 spans. |
| 10 | Overhead cables | Power | 6.30 | | | | 54 | |
| 11 | Somerleyton bridge | Highway | 6.60 | 124 | 94 | | 18 | Fixed. Navigable channel through right opening. |
| | **Morrison Channel** | | | | | | | |
| 12 | Overhead cables | Power | 1.17 | | | | 57 | |
| 13 | Wayne St. (I—94) bridge | Highway | 1.19 | | | 90 | 36 | Fixed. |
| 14 | Overhead cable | Power | 1.46 | | | | 56 | |
| 15 | Overhead cable | Power | 1.76 | | | | 57 | |
| 16 | Overhead cable | Power | 1.92 | | | | 63 | |
| | **Paw Paw River** | | | | | | | |
| 17 | Overhead cable | Power | 1.49 | | | | 38 | |
| 18 | Overhead cable | | 1.50 | | | | | Data not available. |
| 19 | CSX Transportation, Inc. bridge | Railroad | 1.51 | | | 45 | 6 | Fixed. |
| 20 | Overhead cables | Power | 1.57 | | | | 31 | |
| 21 | Overhead cables | Telephone | 2.02 | | | | 27 | |
| 22 | Klock Rd. bridge | Highway | 2.05 | | | 53 | 9 | Fixed. |
| 23 | North Shore Rd. bridge | Highway | 2.57 | | | 39 | 9 | Fixed. |
| 24 | Overhead cable | | 2.58 | | | | | Data not available. |
| 25 | Paw Paw Ave. bridge | Highway | 3.15 | | | 45 | 11 | Fixed. |
| 26 | Overhead cable | | 3.15 | | | | | Data not available. |
| 27 | Overhead cable | | 3.17 | | | | | Data not available. |
| 28 | CSX Transportation, Inc. bridge | Railroad | 3.18 | | | | 8 | Fixed. |
| 29 | Overhead cable | | 3.19 | | | | | Data not available. |

Note 1.—See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.
Note 2.—See **33 CFR 117.1 through 117.59 and 117.651**, chapter 2, for drawbridge regulations.

Deep water is within 0.5 mile of shore. The Palisades Nuclear Power Plant 6 miles SSW of South Haven is prominent.

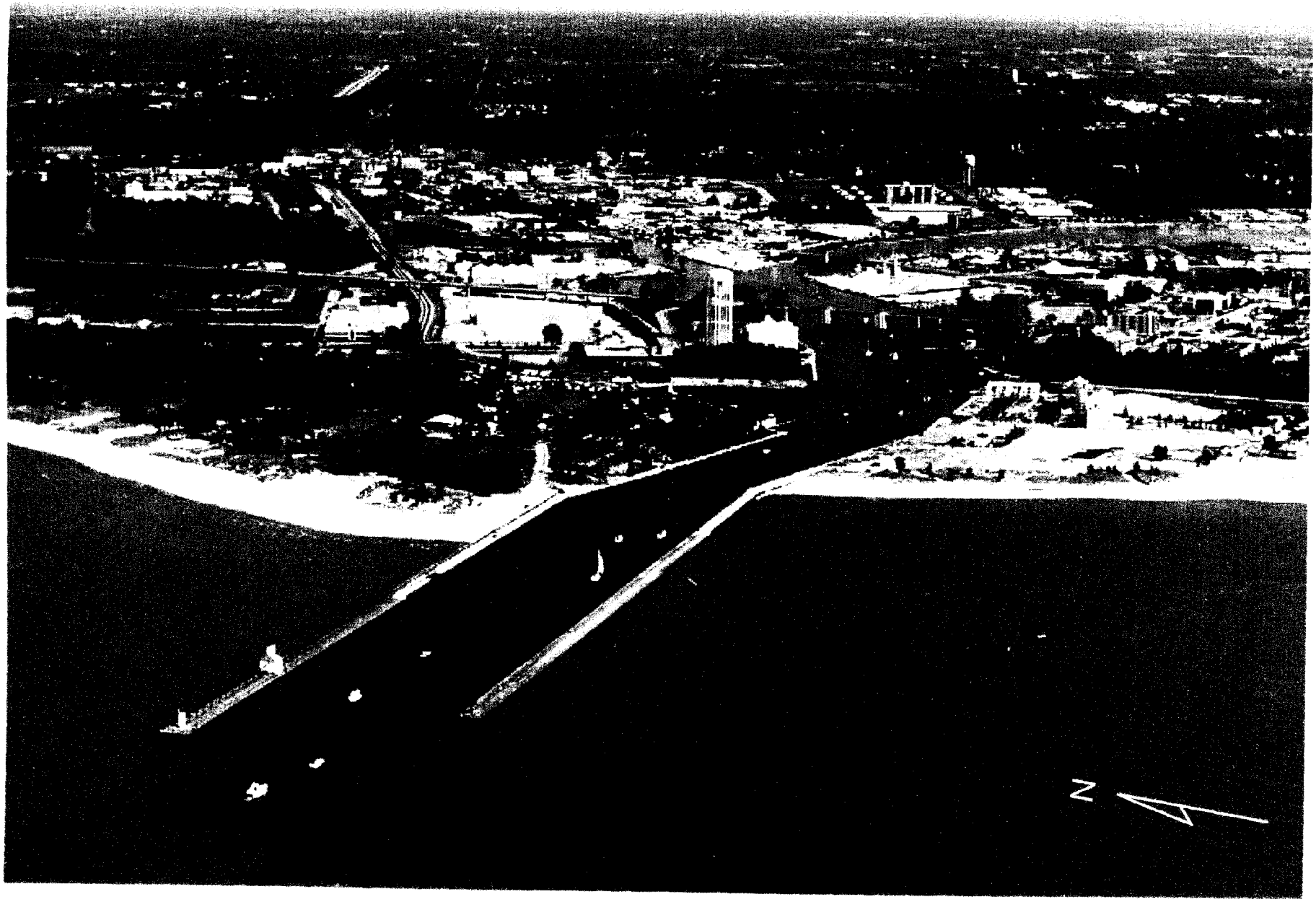
(357) **Charts 14905, 14930.**–The **St. Joseph River** flows into Lake Michigan 22 miles SSW of South Haven and 107 miles S of Little Sable Point. The port cities of **St. Joseph, Mich.**, and **Benton Harbor, Mich.**, are on the W and E sides of the river, respectively. The principal commodities handled in the harbor are gravel and cement.

(358) **Prominent features.**–A blue cupola about 0.8 mile ESE of St. Joseph North Pierhead Light and a lighted white tank with St. Joseph written on it, 1,100 feet NNE of the cupola, are prominent.

(359) **St. Joseph North Pierhead Light** (42°07.0′N., 86°29.7′W.), 31 feet above the water, is shown from a white cylindrical tower on the outer end of the N pier; a fog signal is at the light. This light is sometimes obscured by city lights in the background.

(360) **Channels.**–A dredged entrance channel leads from deep water in Lake Michigan between parallel piers through the mouth of St. Joseph River upstream for about 1 mile to the junction with **Paw Paw River.** The outer ends of the piers are marked by lights, and the N pier has an inner light. A turning basin is on the N side of the channel just below the junction. A canal extends from the turning basin through the mouth of Paw Paw River, thence continues E to Riverview Drive.

## St. Joseph / Benton Harbor



(361) In May 1998, the controlling depths were 21 feet (22 feet at midchannel) in the approach channel; thence in 1996, 15 feet at midchannel to the CSX railroad bridge, thence 14 feet to the canal with 12 to 20 feet in the basin, thence 8½ feet (12 feet at midchannel) to the head of the project. The canal and the area of the junction of St. Joseph and Paw Paw Rivers are subject to shoaling.

(362) Currents in the river attain velocities up to 3 mph.

(363) Navigation should not be attempted close to the piers due to stone riprap. Mooring to the piers and revetments is prohibited.

(364) Above the dredged channel, the St. Joseph River turns S and flows between St. Joseph on the W bank and the city of Benton Harbor on the E bank. In 1980, this reach had depths of 6 to 20 feet in the best channel, generally near the E bank. Small islands near midstream in this reach are sometimes submerged during high water conditions. Depths of 2 to 3 feet can be carried for about 7 miles above St. Joseph. The river is obstructed by dams at Berrien Springs, about 22 miles above St. Joseph.

(365) **Morrison Channel** cuts across the S turn in the St. Joseph River leaving the river about 1 mile above the pierheads and rejoining it about 2.5 miles above the pierheads. The channel is separated from the river channel by **Marina Island.** In 1971, Morrison Channel had a centerline controlling depth of 6 feet.

(366) Above the dredged channel in the Paw Paw River, the crooked channel is navigable by small craft for about 2 miles to the Paw Paw Avenue bridge. In 1968, the centerline controlling depth was 1 foot.

(367) **St. Joseph Coast Guard Station** is near the inner end of the N pier.

(368) **Towage.**–Tugs are available from Sault Ste. Marie, Chicago, and Milwaukee. (See Towage under these sections.)

(369) **Harbor regulations.**–A **speed limit** of 8 mph (7 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

(370) Harbor regulations for the city of St. Joseph are enforced by the **harbormaster** and copies may be obtained from City Manager, City Hall, City of St. Joseph, St. Joseph, Mich. 49085.

(371) Harbor regulations for the city of Benton Harbor are enforced by the **harbormaster,** who is the chief of police. Copies of the regulations may be obtained from the Chief of Police, 200 Wall Street, Benton Harbor, Mich. 49022.

(372) **Wharves.**–St. Joseph and Benton Harbor have several deep-draft facilities along the dredged section of the St. Joseph River. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

(373) **Lafarge Corp. Dock:** N side of river above CSX railroad bridge; 560-foot face; 20 to 21 feet alongside; deck height, 7 feet; vessels unload through 10 inch pipelines; water connections; receipt of bulk cement; owned and operated by Lafarge Corp.

(374) **Bluewater Constructors Dock:** S side of river 400 yards above Interstate 94 bridge; about 400-foot face; 18 to 21 feet alongside; deck height, 6½ feet; 75,000 square feet covered storage; 9 acres open storage; receipt of sand, gravel, salt, stone, and fertilizer; owned by Leco Corp. and operated by Bluewater Constructors.

(375) **Consumers Asphalt and Concrete Co. Dock:** (42°06′47″N., 86°28′16″W.); 1,000-foot face; 16 to 20 feet alongside; deck height, 4 feet; 7 acres open storage; receipt of sand, stone, salt, iron ore, and steel products; owned and operated by Consumers Asphalt and Concrete Co.

(376) **Small-craft facilities.**–A public docking facility developed by the Michigan State Waterways Commission is just E of the Coast Guard Station. Transient berths, water, electricity, sewage pump-out facilities, and harbormaster services are available. A 60-ton hoist is available for hull, engine, and electronic repairs. Several privately operated marinas are in the harbor.

(377) **Supplies.**–Vessels occasionally bunker at the Enterprise Oil and Gas Co. Dock 900 feet above the Interstate 94 bridge.

(378) **Chart 14905.**–From the mouth of St. Joseph River, the shoreline trends SSW, thence SW, for about 35 miles to Michigan City. The shore in this stretch is a moderate bluff for the first 7 miles, thence a range of 200- to 400-foot hills for next 8 miles, and thence low bluffs for the next 20 miles to Michigan City. Deep water is within 0.6 mile of shore. The Donald C. Cook Nuclear Plant 10 miles SSW of St. Joseph is prominent.

(379) **New Buffalo, Mich.,** is a small-craft harbor about 25 miles SW of St. Joseph and about 10 miles NE of Michigan City.

(380) **Channels.**–A dredged entrance channel leads E from deep water in Lake Michigan between converging breakwaters, thence SE to the mouth of the **Galien River** and upstream for about 0.2 mile. The outer ends of the breakwaters are marked by lights. Private, seasonal buoys mark shoaling near the S channel edge in the approach to the harbor, just inside the breakwaters. In May 1996, the controlling depths were 3½ feet in the S half of the channel and 5½ feet in the N half of the channel.

(381) The outer basin enclosed by the breakwaters has an area of about 6 acres; it is not adapted for anchorage of vessels, but reduces wave action in the lower section of the river. Mooring to the breakwaters is prohibited. Navigators are cautioned against navigating outside channel limits in the vicinity of structures protected by rock riprap along their sides.

(382) **Small-craft facilities.**– The harbor was developed by the Michigan State Waterways Commission. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps are available. Hoists to 30 tons are available for complete marine repairs.

(383) The **State boundary** between Michigan and Indiana is about 4.5 miles SW of New Buffalo entrance. **Central Standard Time** is observed on the lakeshore areas of Indiana and in the States of Illinois and Wisconsin.

(384) **Charts 14905, 14926.–Michigan City, Ind.,** is a small-craft and fishing harbor at the mouth of **Trail Creek,** 35 miles SSW of St. Joseph and 38 miles SE of the mouth of the Chicago River.

(385) **Prominent features.**–A cooling tower and the tallest of four stacks, S and SSE of the harbor entrance respectively, are prominent.

(386) **Michigan City East Pierhead Light** (41°43.7′N., 86°54.7′W.), 55 feet above the water, is shown from a white octagonal tower with a red roof and an attached building on the outer end of the E pier; a fog signal is at the light.

(387) **Channels.**–The entrance to Trail Creek is protected on the W by a detached breakwater. A dredged entrance channel leads S from deep water in Lake Michigan past the E end of the breakwater, turns SE, then S again between two piers at the mouth of the creek. The ends of the detached breakwater and the outer ends of the piers are marked by lights. Inside the creek, the channel leads upstream for about 1.3 miles to the E Street bridge. Turning basins are on the S side of the channel about 600 feet below the Franklin Street bridge and on the SW side about 400 feet above the Second Street bridge. A small-craft basin, on the NE side of the entrance channel, is entered through a cut in the E pier and is protected on the N side by a breakwater.

Michigan City, IN
N

## Structures across Trail Creek
### *Miles above West Pierhead Light
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 1 | Franklin St. bridge | Highway | 0.50 | | | 120 | 17 | Bascule. Note 1. |
| 2 | Amtrak bridge | Railroad | 0.85 | 41 | 44 | | 7 | Swing. Note 2. |
| 3 | Second St./U.S. 12 bridge | Highway | 0.93 | | | 120 | 46 | Fixed. |
| 4 | Sixth St. bridge | Highway | 1.19 | | | 69 | 10 | Bascule. Note 1. |
| 5 | Overhead cable | | 1.33 | | | | | Data not available. |
| 6 | Overhead cable | | 1.48 | | | | | Data not available. |
| 7 | E St. bridge | Highway | 1.49 | | | | | Fixed. Head of navigation. |

Note 1.—See **33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.
Note 2.—See **33 CFR 117.1 through 117.59 and 117.401,** chapter 2, for drawbridge regulations.

(388) In June 1996, the controlling depths were 9 feet (12 feet at midchannel) between the E and W breakwaters to the first turning basin; thence in 1993, 9 feet in the basin, thence 3½ feet to the second turning basin; thence in 1994, 7 feet to the E street bridge. In 1991, the second turning basin had a controlling depth of 2½ feet in the N part decreasing to about ½ foot towards the S part. In April 1999, the small-craft basin had controlling depths of 12 feet in the N part and 8 feet in the S part.

(389) The piers and breakwaters are riprapped with large stones on all water sides. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(390) **Caution.**–Strong NNW winds may cause large swells in the outer harbor and the entrance channel. Under heavy sea conditions, small craft are advised to use extreme caution when transiting this area.

(391) **Michigan City Coast Guard Station** is on the E side of the harbor entrance.

(392) **Harbor regulations.**–A **speed limit** of 8 mph (7 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) Local regulations have been established by the city of Michigan City and are enforced by a **harbormaster.** Copies of regulations may be obtained from the harbormaster's office at Washington Park Marina, just E of the Coast Guard Station.

(393) **Small-craft facilities.**–The municipal marina on the E side of the entrance channel provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and launching ramps. Marine supplies and hoists to 50 tons for hull, engine, and electronic repairs are available at several marinas in the lower mile of Trail Creek.

(394) From Michigan City SW for about 23 miles to Gary, the shore is bordered by 100- to 200-foot hills, and deep water is within 0.5 mile. An obstruction, covered ½ foot, is close to shore 1.5 miles SW of the mouth of Trail Creek.

(395) The S end of Lake Michigan is fully exposed to storms from the N, the fetch being about 300 miles. All severe storms from NW to NE create hazardous conditions, including powerful and dangerous seas, and strong currents running E to W or W to E, depending on the prevailing winds. An added unfavorable condition is found in the sandy nature and gentle slope of the lake bottom, depths of 70 feet occurring 8 to 10 miles from shore.

(396) **Indiana Dunes National Lakeshore** is at the S end of Lake Michigan, generally between Michigan City and Gary, Indiana. The Lakeshore was authorized in 1966 and formally established within the National Park Service in 1972. Rules and regulations in **36 CFR 31** and Indiana State laws governing the Lakeshore area are enforced by National Park Service personnel on Federally owned lands. Copies of the Federal Regulations are generally available in major libraries.

(397) The National Park Service does not provide facilities for boaters at this time. Although the land acquisition program is nearly complete, not all sections of land to be included in the Park have actually been acquired to date. All mariners are advised that portions of the shore area remain as private property and occupancy in any manner may constitute trespassing on private property.

(398) Certain portions of the shore have been designated as swimming beaches; these areas are closed to boats and are marked by buoys during the swimming season.

(399) **Burns International Harbor,** 14 miles SW of Michigan City, is an artificial harbor formed by a breakwater extending lakeward from the shore and turning E to enclose a harbor basin and two dredged arms which extend S from the basin into the shoreline. The harbor is entered SW from deep water in Lake Michigan on the S side of the breakwater. The NW corner and E end of the breakwater, and the S side of the harbor entrance, are marked by lights.

(400) In April-May 1996, the controlling depths were 27 feet in the entrance channel and Outer Basin, and 25 feet in East Harbor Arm and in West Harbor Arm.

(401) The Indiana Port Commission has constructed a bulkhead and fill in the area between East Harbor Arm and West Harbor Arm, and Bethlehem Steel Corporation has constructed a bulkhead and fill that extends about 1 mile E of the harbor entrance. These bulkheads are riprapped with stone. Mariners are advised to exercise caution when navigating in this area.

(402) **Dangers.**–A submerged pipe, covered 1½ feet, has been reported about 125 feet N of the light marking the N side of the harbor entrance.

(403) **Towage.**–Tugs to 1,640 hp are available at Burns International Harbor from Great Lakes Towing Co. (800-321-3663) or from Calumet (South Chicago) Harbor. (See Towage under Calumet (South Chicago) Harbor.)

(404) **Harbor regulations.**–Local regulations are established and enforced by the Indiana Port Commission. Copies of the regulations can be obtained from Burns International Harbor, 6600 U.S. Highway 12, Portage, Ind. 46368.

(405) **Radio facility.**–The Indiana Port Commission operates a radio facility on VHF-FM channels 16, 10, 12, and 68, call sign, KVF 866. Communication with commercial and pleasure craft provides improved traffic control, and in conjunction with the State Police patrol boat, improved harbor security.

(406) **Wharves.**–Burns International Harbor has deep-draft facilities in East and West Harbor Arms. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the Indiana Port Commission or the operator.) Water and electrical shore-power connections are available at most berths in the harbor.

(407) **Facilities in West Harbor Arm:**

(408) **Midwest Steel, Barge Dock:** inner end of W side; 684-foot face; 27 feet alongside; deck height, 6 feet except 13 feet for center 300-foot section; open storage for 300,000 tons of steel products; cranes to 110 tons; receipt of coiled steel and shipment of steel products; owned and operated by Midwest Steel Division National Steel Corp.

(409) **Indiana Port Commission, Berth 5:** S end of arm; 600 feet of berthing space along dolphins; 27 feet alongside; deck height, 13 feet, 6 acres open storage; rental equipment available; receipt of stone, coal, and miscellaneous bulk materials by self-unloading vessels; conveyor to potash storage at rear, rate, 2,000 tons per hour; owned by Indiana Port Commission and operated by Indiana Port Commission and Domtar, Inc.

(410) **Indiana Port Commission, Berths 1, 2, 3, and 4:** inner end of E side; 1,800-foot face; 27 feet alongside; deck height, 13 feet; 118,000 square feet covered storage; 10 acres open storage; cranes to 150 tons; receipt and shipment of steel and general and containerized cargo; owned by Indiana Port Commission and operated by Indiana Port Commission and Ceres Marine Terminals, Inc.

(411) **Facility in the harbor basin:**

(412) **Indiana Port Commission, Cargill Dock:** S side of basin between East and West Harbor Arms; 610 feet of berthing space with dolphins; 27 feet alongside; deck height, 13 feet; 4¼-million-bushel grain elevator; vessel loading spout, 90,000 bushels per hour; shipment of grain; owned by Indiana Port Commission and operated by Cargill, Inc.

(413) **Facilities in East Harbor Arm:**

(414) **Indiana Port Commission, Berths 6 and 7:** inner end of W side; 1,280-foot face; 27 feet alongside; deck height, 13 feet; 13 acres open storage; tank storage for 4¾ million gallons; cranes to 150 tons; receipt and shipment of blast furnace slag, steel, liquid fertilizer, liquid caustic soda, and miscellaneous bulk materials; owned by Indiana Port Commission and operated by various operators.

(415) **Indiana Port Commission, Berth 8:** S end of arm; 360-foot face; 27 feet alongside; deck height, 13 feet; 2 acres open storage; tank storage for 2¾ million gallons; cranes to 150 tons; receipt and shipment of steel products, liquid fertilizer, liquid caustic soda, and miscellaneous bulk materials; owned by Indiana Port Commission and operated by various operators.

(416) **Bethlehem Steel Corp., Burns Harbor Plant Dock:** E side of arm; 3,742-foot face; 27 feet alongside; deck height, 14 feet; 25 acres open storage; two 20-ton bucket unloaders, maximum rate 1,800 tons per hour for iron ore pellets; receipt of iron ore pellets and limestone, shipment of steel mill products; owned and operated by Bethlehem Steel Corp.

(417) **Portage-Burns Waterway** is a drainage canal about 2 miles SW of the entrance to Burns International Harbor. A small-craft harbor at the mouth of the waterway is protected on the NE side by a jetty and on the N and W sides by breakwaters. The outer ends of the breakwaters are marked by lights. The waterway extends inland from the small-craft harbor for about 1.5 miles to connect with Little Calumet River.

(418) A dredged entrance channel leads E between the outer ends of the breakwaters, turns S through the small-craft harbor, and continues inland for about 1 mile. In August 1995, the controlling depths were 3½ feet in the entrance channel, thence 3 feet in the channel through the small-craft harbor and in the dredged inland section of the waterway. Dangerous shoals form rapidly in the dredged sections of the waterway, and mariners are advised to navigate the waterway with extreme caution.

(419) The waterway is crossed by bridges and overhead cables and pipelines, all of unknown clearance.

(420) A marina on the W side of Portage-Burns Waterway about 0.8 mile above the entrance provides transient berths, gasoline, water, electricity, sewage pump-out, limited marine supplies, a launching ramp, and a 12-ton hoist.

(421) **Charts 14905, 14926, 14927.–Gary Harbor** is a private harbor at the S extremity of Lake Michigan, about 22 miles SW of Michigan City and 14 miles SE of Calumet Harbor entrance. The entirely artificial harbor was developed and is owned by United States Steel Corp.

(422) **Channels.**–The harbor comprises a channel extending S into the shoreline for about 1 mile between parallel piers to a turning basin. The entrance to the channel is protected by a breakwater extending generally NE from the W side of the entrance. The outer end of the breakwater and outer ends of the piers are marked by private lights. A fog signal is at the breakwater light. A bulkhead, enclosing a fill area along the shore, extends 1.8 miles E from the E side of the channel entrance and is marked at its E end by a light. An unmarked shoal extends about 400 yards NNE of the E entrance point.

(423) Depths in the channel are maintained to at least 27 feet. Just inside the entrance, the channel is crossed by an overhead pipeline with a clearance of 125 feet and an overhead power cable with a clearance of 132 feet. About 0.65 mile above the entrance, the channel is crossed by an overhead conveyor with a clearance of 125 feet.

(424) **Towage.**–Tugs are available from Calumet (South Chicago) Harbor. (See Towage under Calumet (South Chicago) Harbor.)

(425) **Wharves.**–United States Steel Corp. operates deep-draft berths along both sides of the channel at Gary Harbor. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for these berths are reported depths. (For information on latest depths, contact the operator.)

(426) **West Dock:** 5,280 feet of berthing space; 27 to 31 feet alongside; deck height, 11 feet; open storage for over 4 million tons of material; four hulett-type unloaders, 600 tons per hour each; receipt of iron ore, iron ore pellets, and limestone.

(427) **East Dock:** 4,352 feet of berthing space; 27 to 29 feet alongside; deck height, 11 feet; open storage for 500,000 tons of material; cranes to 100 tons; receipt of limestone and dolomite, shipment of scrap metal and steel mill products.

(428) **Charts 14905, 14926, 14927, 14929.**–From Gary Harbor to Wilmette, Ill., 36 miles NW, the SW shore of Lake Michigan is developed with extensive private commercial facilities, public utilities, marinas, and yacht clubs.

(429) **Buffington Harbor,** a private harbor owned by the Universal Atlas Cement Division of the U.S. Steel Corp., is about 3 miles SE of Indiana Harbor and 4.5 miles NW of Gary Harbor. The harbor is built in the lake in front of the company's plant on bulkheaded and filled land that extends 2,400 to 2,900 feet beyond the natural shoreline.

(430) **Channels.**–The harbor basin is protected on the W and N sides by a breakwater that extends from the shore W of the wharf which forms the E side of the basin. The outer end of the breakwater and the wharf are marked by private lights; a private fog signal is at the wharf light, and a wave gauge is about 500 feet N of the light at the N end of the breakwater. A private **236½°** lighted range at the head of the basin marks the harbor approach. The basin has been dredged to 26 feet, but the depths gradually decrease to about 12 feet along the breakwater on the W side of the harbor. A breakwater extends from the W breakwater and from the S shore of the harbor forming a protected inner basin at the SW corner of the harbor.

(431) From the NE end of the wharf, the entire shoreline for about 4.5 miles SE to Gary Harbor has been bulkheaded and filled.

(432) The wharf on the E side of the basin provides 2,128 feet of berthing space with dolphins and a deck height of 8 feet. The reported depth alongside is 20 to 28 feet. There is open storage for about 1¼ million tons of material, and a retractable conveyor can load vessels with slag at 1,000 tons per hour. Limestone, bauxite, cement clinker, and bulk materials are received, and slag and miscellaneous bulk materials are shipped.

(433) **Towage.**–Tugs are available from Calumet (South Chicago) Harbor. (See Towage under Calumet (South Chicago.) Harbor.)

(434) **Indiana Shoals,** an extensive bank in the approaches to Indiana Harbor and Calumet Harbor, extends about 5 miles NE from the outer end of the fill area which forms the E side of the entrance to Indiana Harbor. The bank has several ridges with depths of 15 to 18 feet near its inner end, and has depths of 22 to 30 feet near its outer end. A lighted gong buoy marks the E side of the bank.

(435) A wreck, covered 21 feet, is N of Indiana Shoals, 6.2 miles NE of the entrance to Indiana Harbor. The wreck is marked on the W side by a buoy.

(436) **Indiana Harbor,** an artificial harbor at **East Chicago, Ind.,** is about 3 miles NW of Buffington Harbor and 6 miles SE of Calumet Harbor. The harbor has an outer basin which is entered from N and is enclosed by bulkheaded fill areas that extend 2.6 miles NE from the natural shoreline. The outer corners of the bulkheads are marked by private lights. The fill area S and E of the basin is occupied by Inland Steel Co., and the area W of the entrance channel and basin is occupied by LTV Steel Co. The inner harbor is formed by a dredged canal that extends SW from the outer basin into the shoreline.

(437) **Indiana Harbor East Breakwater Light** (41°40.9′N., 87°26.5′W.), 78 feet above the water, is shown from a square tower on the E side of the entrance channel; a fog signal is at the light.

(438) **Channels.**–The dredged entrance channel leads SSE from deep water in Lake Michigan between breakwaters to an outer harbor basin. The entrance channel is marked by a buoy and by lights on the outer and inner ends of the breakwaters. From the outer harbor basin, a canal entrance channel extends SW to **Indiana Harbor Canal,** which continues SW for 1.4 miles to a turning basin at **The Forks.** The entrance to the canal is marked by lights. The channel width in the canal is restricted by the clear width of the bridge span openings of 61.7 feet. From The Forks, **Calumet River Branch** extends S for about 0.4 mile to just below Columbus Drive bridge, and **Lake George Branch** extends W for about 0.6 mile.

(439) In August 1990, the controlling depths were 23 feet at midchannel in the entrance channel, thence 19 feet in the outer harbor basin and in the entrance channel to Indiana Harbor Canal, thence 11 feet at midchannel through the canal, thence 10 feet in the turning basin at The Forks, thence 5½ feet in the Calumet River Branch, and thence, in Lake George Branch, 13 feet at midchannel to the W end.

(440) Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(441) **Caution.**–A floating oil boom is permanently moored across Lake George Branch just above the dredged channel.

(442) **Towage.**–Tugs for Indiana Harbor are available from Calumet (South Chicago Harbor. (See Towage under Calumet (South Chicago) Harbor.)

(443) **Wharves.**–Indiana Harbor has numerous deep-draft facilities in the outer basin, along both sides of Indiana Harbor Canal, and in the branch channels. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) Some of the facilities described have water and electrical shore-power connections, and most have highway and rail connections. Many of the facilities are used for mooring vessels during the closed navigation season.

(444) **Facilities on the N side of Indiana Harbor Canal:**

(445) **LTV Steel Co., Indiana Harbor Works, Barge Dock:** outer end of canal entrance channel adjacent to outer basin; 1,009-foot face; 18 to 24 feet alongside; deck height, 7½ feet; open storage for 36,000 tons of limestone and 597,000 tons of iron ore pellets; 25-ton mobile hoist; receipt of limestone; owned and operated by LTV Steel Co., Indiana Harbor Works.

(446) **LTV Steel Co., Indiana Harbor Works, Ore Dock:** adjacent W of Barge Dock; 2,275-foot face; 20 to 25 feet alongside; deck height, 7½ feet; trough and bin storage for over 1½ million tons of material; two bucket unloaders, 600-ton-per-hour capacity each; receipt of iron ore pellets, iron ore, and limestone; owned and operated by Jones and Laughlin Steel Corp.

(447) **United States Gypsum Co. Dock:** between Elgin, Joliet and Eastern Railway bridge and The Forks; 991-foot face; 15 to 19 feet alongside; deck height, 6 feet; self-unloading vessels moor in channel and discharge by boom to 100,000-ton capacity storage shed; receipt of gypsum rock; owned and operated by United States Gypsum Co.

(448) **Facilities in Lake George Branch:**

(449) **Amoco Oil Co. Dock:** N side immediately W of The Forks turning basin; 1,430-foot face; 21 to 29 feet alongside; deck

## Structures across Indiana Harbor Canal
### *Miles above Indiana Harbor Outer Basin
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Main Channel** | | | | | | | |
| 1 | Elgin, Joliet & Eastern Ry. bridge | Railroad | 0.68 | | | 61 | 8 | Bascule. Note 1. |
| 2 | Overhead cables | | 0.68 | | | | 199 | |
| 3 | CSX RR bridge | Railroad | 0.70 | | | 66 | 8 | Bascule. Note 1. |
| 4 | ConRail bridge | Railroad | 0.71 | | | 65 | 7 | Bascule. Note 1. |
| 5 | ConRail bridge | Railroad | 0.72 | | | 65 | 7 | Bascule. Note 1. |
| 6 | Overhead pipeline | | 0.73 | | | 65 | 125 | |
| 7 | Indiana Harbor Belt RR bridge | Railroad | 0.73 | | | 65 | 7 | Bascule. In permanent open position. |
| 8 | Overhead cable | Power | 1.20 | | | | 110 | |
| 9 | Dickey Road bridge | Highway | 1.21 | | | 118 | 18 | Bascule. Notes 1, 2 and 4. |
| 10 | Overhead cable | | 1.23 | | | | 145 | |
| 11 | Cline Avenue (S912) bridge | Highway | 1.61 | | | 230 | 100 | Fixed. |
| 12 | Overhead cables | Power | 1.86 | | | | 140 | |
| 13 | Canal St. bridge | Highway | 1.88 | | | 65 | | Bridge leaves removed. Note 3. |
| 14 | Elgin, Joliet & Eastern Ry. bridge | Railroad | 1.89 | | | 65 | 5 | Bascule. Note 1. |
| | The Forks | | 2.10 | | | | | |
| | **Calumet River Branch** | | | | | | | |
| 15 | Overhead cable | | 2.58 | | | | | Data not available. |
| 16 | Columbus Dr. bridge | Highway | 2.60 | | | 41 | 8 | Temporary trestle. |
| 17 | South Chicago & Southern and CSX RR bridge | Railroad | 3.21 | | | 34 | 3 | Fixed. |
| 18 | Chicago Ave. bridge | Highway | 3.29 | | | 50 | 9 | Fixed. |
| 19 | Indiana Harbor Belt RR bridge | Railroad | 3.99 | | | 36 | 4 | Fixed. |
| 20 | Elgin, Joliet & Eastern Ry. bridge | Railroad | 4.00 | | | 52 | 3 | Fixed. |
| | **Lake George Branch** | | | | | | | |
| 21 | Overhead cable | | 2.58 | | | | | Data not available. |
| 22 | Indianapolis Blvd. bridge | Highway | 2.59 | | | 64 | 12 | Bascule. Notes 1, 2 and 4. |
| 23 | Overhead cable | | 2.60 | | | | 111 | |
| 24 | Overhead cable | | 3.00 | | | | | Data not available. |
| 25 | CSX RR bridge | Railroad | 3.01 | | | 65 | 5 | Fixed. |
| 26 | Overhead cable | Power | 3.07 | | | | 26 | |

**Note 1.**—See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.
**Note 2.**—Vertical clearance is at center of span.
**Note 3.**—In 1984, deteriorated abutments were reported to have reduced the horizontal clearance to about 60 feet.
**Note 4.**—Bridge undergoing reconstruction in 1986.

height, 6 feet; tank storage for over 2 million barrels; receipt and shipment of petroleum products; owned and operated by Amoco Oil Co.

(450) **Associated Box Corp. Dock:** immediately W of Amoco Oil Co. Dock; 377-foot face; 17 to 25 feet alongside; deck height, 6 feet; tank storage for 890,000 barrels; receipt and shipment of petroleum products; owned by Associated Box Corp. and operated by American Recovery Co., Inc., Clark Oil and Refining Corp., and Bigane Vessel Fueling Co.

(451) **Energy Cooperative Inc., East Chicago Refinery Dock:** N side above Indianapolis Boulevard bridge; 1,347-foot face; 23 to 27 feet alongside; deck height, 6 feet; storage for about 2½ million barrels; shipment of petroleum products; owned and operated by Energy Cooperative Inc.

(452) **Cy's Trucking and Transfer Co., Inc. Dock:** S side immediately W of The Forks turning basin; 600-foot face; 23 feet alongside; deck height, 9 feet; 18,000 square feet covered storage; cranes to 80 tons; receipt of steel and bulk products; owned and operated by Cy's Trucking and Transfer Co.

(453) **Facilities in Calumet River Branch:**

(454) **Cities Service Co. Dock:** W side of the branch 1,000 feet below Columbus Drive bridge; 600-foot face; 15 to 19 feet alongside; deck height, 9 feet; tank storage for 4 million barrels; occasional receipt and shipment of petroleum products; owned and operated by Cities Service Co.

(455) **Mobil Oil Corp., Calumet River Branch South Dock:** W side of the branch below Columbus Drive bridge; 640-foot face; 11 to 21 feet alongside; deck height, 9 feet; tank storage for 1 million barrels; shipment of petroleum products; bunkering vessels; owned and operated by Mobil Oil Corp.

(456) **Phillips Pipe Line Co., East Chicago Terminal Dock:** E side of the branch 700 feet below Columbus Drive bridge; 600-foot face; 7 to 19 feet alongside; deck height, 8 feet; tank storage for 3¼ million barrels; shipment and occasional receipt of petroleum products; owned and operated by Phillips Pipe Line Co.

(457) **Northern Indiana Dock Co. Wharf:** E side of the branch 1,500 feet below Columbus Drive bridge; 479-foot face; 14 to 19 feet alongside; deck height, 7 feet; cranes to 60 tons; receipt and shipment of scrap metal; owned and operated by Northern Indiana Dock Co., Inc.

(458) **Facilities on the S side of Indiana Harbor Canal:**

(459) **Inland Steel Co., Plant No. 3 Dock:** between ConRail bridge and Dickey Place bridge; 990-foot face; 13 to 20 feet alongside; deck height, 8 feet; storage bins and troughs for over 1 million tons of material; two bucket unloaders, combined rate 800 tons per hour; receipt of iron ore pellets and limestone; owned and operated by Inland Steel Co.

(460) **Inland Steel Co., Plant No. 2 Dock:** outer end of canal entrance channel adjacent to outer basin; 3,465-foot face; 20 to 28 feet alongside; deck height, 6 to 8 feet; storage bins for over 2 million tons of material; five unloading cranes with buckets, unloading rate 1,000 tons per hour each; receipt of iron ore, iron ore pellets, and limestone; bunkering vessels; owned and operated by Inland Steel Co.

(461) **Facilities on the E side of the outer basin:**

(462) **Inland Steel Co., No. 4 Dock:** southernmost dock on E side of outer basin; 1,075 feet of berthing space along dolphins; 14 to 22 feet alongside; deck height, 3 to 5 feet; open storage for 240,000 tons of limestone; receipt of limestone; owned and operated by Inland Steel Co.

(463) **Inland Steel Co., No. 6 Dock:** immediately N of Inland Steel Co., No. 4 Dock; 3,370-foot face; 28 feet alongside; deck height, 6½ feet; open storage for over 2 million tons of material; cranes to 150 tons; receipt of fluorspar, limestone, iron ore pellets, coke, and plant machinery; shipment of steel mill products and ammonium sulphate; owned and operated by Inland Steel Co.

(464) **Small-craft facility.**–A marina on the lakeshore just S of the fill area that forms the E side of Indiana Harbor provides gasoline and a 5-ton hoist.

(465) Commonwealth Edison Co. of Indiana powerplant is on a bulkheaded fill area 4 miles NW of the entrance to Indiana Harbor.

(466) The **State boundary** between Indiana and Illinois is just W of the powerplant about 4 miles NW of Indiana Harbor entrance.

(467) **Calumet (South Chicago) Harbor** is 14 miles NW of Gary Harbor and about 333 miles by water from the Straits of Mackinac. The harbor is in the S part of the city of **Chicago, Ill.,** and comprises an outer harbor protected by breakwaters and the **Calumet River.** The city of Chicago, including Calumet and Chicago Harbors, is one of the largest inland ports in the world. Deep-draft traffic enters the harbors from Lake Michigan, and barge traffic enters from the Mississippi River via the Illinois Waterway. The principal commerce in the port includes receipt of iron ore, coal, and limestone.

(468) **Prominent features.**–Stacks at the Commonwealth Edison Co. of Indiana powerplant 1.8 miles S of the mouth of Calumet River and at the U.S. Steel Corp. plant on the N side of the river mouth are prominent. A spire in Whiting, Ind., 3.9 miles S of the river mouth, is also prominent.

(469) **Calumet Harbor Light** (41°44.3′N., 87°30.5′W.), 51 feet above the water, is shown from a white cylindrical tower with an attached building on the N side of the breakwater gap 1.2 miles E of the Calumet River mouth.

(470) **Calumet Harbor Breakwater South End Light** (41°43.5′N., 87°29.6′W.), 50 feet above the water, is shown from a white square skeleton tower, lower half open, on the SE end of the Calumet Harbor breakwaters; a fog signal and a radiobeacon are at the light. This light is sometimes difficult to distinguish from vehicle lights on shore.

(471) **Channels.**–A breakwater and breakwater extension extend E from the shore about 0.5 mile N of the mouth of Calumet River and turn SE to protect the river entrance and provide an outer harbor of refuge 1 square mile in extent. The outer end of the breakwater and each end of the extension are marked by lights. A dredged approach channel from Lake Michigan leads SW around the S end of the breakwater extension to the outer harbor. The approach channel is marked by lighted buoys, and the SW limit of the outer harbor basin is marked by buoys. From the W end of the outer harbor, a channel leads between piers through the mouth of the river upstream for about 0.6 mile to the Elgin, Joliet & Eastern Railway bridge. The outer ends of the piers are marked by lights.

(472) In July 1990, the controlling depths were 27 feet (28 feet at midchannel) in the approach channel; thence 25 feet in the outer harbor; thence 23 feet at the mouth of the river; thence 26 feet in the river channel upstream to the Elgin, Joliet & Eastern Railway bridge.

(473) **North Slip** opens into the outer harbor 0.5 mile N of the mouth of Calumet River. Overhead power cables with a clearance of 109 feet cross the mouth of the slip. **South Slip** is entered 0.4 mile above the river mouth. A system of submerged bubbler pipes crosses the mouth of each slip; vessels are cautioned not to drop or drag anchor in the vicinity.

(474) The undredged portion of the outer harbor between the river mouth and the entrance to North Slip has depths of about 2 to 20 feet extending about 0.25 mile from shore. In April 1985, a rock, covered 1 foot, was reported about 470 feet ENE of Calumet Pierhead Light in about 41°44′04″N., 87°31′40″W.

(475) A diked disposal area is on the W side of the outer harbor S of the entrance to Calumet River. The NE corner of the area is marked by a private light.

(476) In the Calumet River, a dredged channel leads from the Elgin, Joliet & Eastern Railway bridge upstream for about 5.5 miles to Turning Basin No. 5. Turning Basin Nos. 1 and 3 are on the E side of the channel 0.9 and 4.5 miles above the mouth of the river, respectively.

(477) In July-August 1991, the controlling depth was 23 feet at midchannel from Elgin, Joliet & Eastern Railway bridge to Turning Basin 3; thence 15 feet upstream to Turning Basin No. 5; thence 25 feet in Turning Basin No. 1 with lesser depths along the N part, 25 feet in Turning Basin No. 3, and 24 feet in Turning Basin No. 5. Several large pieces of concrete have fallen into the water along the S edge of Turning Basin No. 3 and pose a potential danger to navigation.

(478) From Turning Basin No. 5, the Calumet River leads S for 0.7 mile to the Thomas J. O'Brien Lock at the entrance to the Illi-

nois Waterway. About 0.5 mile above the lock, the Calumet River branches into the Little Calumet River and the Grand Calumet River. (The lock and the Little Calumet River are described under Illinois Waterway, this chapter.)

(479) **Grand Calumet River** formerly emptied into Lake Michigan at Gary, Ind., but its mouth is now closed, and it is a dead river 18 miles long with a very small drainage area. There is no current in the river except what is caused by floods and freshets. Except for several shoals, the river is navigable by shallow-draft launches that can pass under the bridges.

(480) The limiting clearances under the bridges are 8 feet for about 3.5 miles, thence 5 feet for about 11 miles. The swing and bascule bridges across the river are inoperable. Several bridges have been replaced by earthfill causeways with only culverts to carry the flow. About 6 miles above the junction with Calumet River, a non-navigable branch connects with Calumet River Branch of Indiana Harbor Canal.

(481) **Lake Calumet,** NW of Turning Basin No. 5, is about 1.2 miles long N and S and about 1 mile wide. The lake is at practically the same level as Lake Michigan and has an average depth of about 2 feet. A temporary earth dike has been constructed at the S end of Lake Calumet by the Illinois International Port.

(482) In July-August 1991, the dredged channel, which leads NW from Turning Basin No. 5 in Calumet River to Lake Calumet, had a controlling depth of 15 feet (25 feet at midchannel).

(483) **Anchorages.**–The outer harbor basin provides good anchorage in mud and sand bottom. Due to the large number of vessels using this important shelter during severe weather, it is important that anchorage space within the harbor be utilized in an orderly manner. Accordingly, it is requested that vessels do not anchor closer than 1,000 feet to any part of the breakwaters unless no other anchorage space is available, and that, if it is necessary to anchor closer than 1,000 feet to the breakwaters, vessels anchor in such manner as not to unreasonably obstruct the free passage and progress of other vessels through the harbor.

(484) In good weather, vessels may also find anchorage within 3 miles E to S of Breakwater South End Light. However, charted wrecks and traffic lanes to Indiana and Calumet Harbors restrict the usable area somewhat.

(485) **Dangers.**–Several shoals are in the approach to Calumet Harbor. A rocky bank with a least depth of 21 feet is 1 mile NE of Calumet Harbor Breakwater South End Light. A lighted buoy at the SE end of the ledge marks the N side of the dredged approach channel. Two 23-foot spots and a 27-foot spot, 2 to 2.5 miles NE of Calumet Harbor Light, are marked on the E side by a lighted bell buoy. **Calumet Bar,** an extensive area with depths of 21 to 24 feet, is on the NE side of the breakwater and extension.

(486) The gap between the breakwater and the extension provides an entrance to the harbor for small craft. However, small craft should exercise caution when using the entrance gap. Dangerous currents frequently exist in the entrance gap, especially during storms. Hazardous currents are also caused by surges resulting from a sudden rise or fall in the lake level. This frequently occurs during periods of calm. The Lake Carriers' Association recommends that cargo vessels use the S entrance exclusively.

(487) In general, the dredged areas of the outer harbor do not extend closer than 300 feet from the breakwaters. Mariners should exercise caution and not attempt to navigate in the undredged areas adjoining the breakwaters. Navigators are cautioned against navigating outside channel limits in the vicinity of structures protected by rock riprap along their sides.

(488) In March 1984, a 150-foot break was reported in the breakwater extension about 150 yards NW of Calumet Harbor Breakwater South End Light; caution is advised.

(489) **Fluctuations of water level.**–In addition to the normal fluctuations which affect Lake Michigan somewhat uniformly, local oscillations of up to 2 feet above or below Low Water Datum are reported to have durations of a few minutes to a few hours. These changes are produced by winds and barometric pressure changes which accompany storms. Strong sustained winds may also affect the water levels for as long as a day.

(490) **Caution.**–Since the opening of Calumet Sag Channel, the Calumet River has a gentle flow away from Lake Michigan except at times of sudden fluctuations of water levels from heavy rains and/or flooding.

(491) **Towage.**–Tugs to 1,640 and 1,250 hp are available in the Calumet (South Chicago) Harbor area from Great Lakes Towing Co. and North American Towing Co., respectively. Arrangements for the former companies' tugs are made through the dispatcher in Cleveland (800-321-3663) or via VHF-FM remote antenna. The North American Towing Co. dispatcher is in Chicago (312-734-6311) and has VHF-FM capability to a 25- mile radius.

(492) Chicago is a **customs port of entry.**

(493) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(494) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(495) **Calumet Harbor Coast Guard Station** is on the lakefront in the S part of Calumet Park, about 1.1 miles S of Calumet River entrance.

(496) **Harbor regulations.**–Local harbor regulations for Calumet Harbor have been established by the Illinois International Port and are enforced by various local law enforcement agencies, who can be reached through the Port. Copies of the regulations can be obtained from the Illinois International Port, 12800 South Butler Drive, Lake Calumet Harbor, Chicago, Ill. 60633. A **speed limit** of 5 mph (4.3 knots) is enforced within the harbor.

(497) **Wharves.**–Calumet Harbor has numerous facilities in the outer harbor, the Calumet River and in Lake Calumet. Only the deep-draft facilities are described. (For complete information on the port facilities, refer to Port Series No. 46, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) Most of the facilities described have highway and rail connections, and many have water and electrical shore-power connections. Many of the piers, wharves, and docks are used for mooring vessels during the closed navigation season.

(498) **Facilities in North Slip:**

(499) **USX Corp., South Works, North Dock:** N side of the slip; 2,432-foot face; 26 to 29 feet alongside; deck height, 10 feet; shipment of slag; owned by USX Corp. and operated by USX Corp. and International Mill Services, Inc.

(500) **Facilities in South Slip, about 0.5 mile above the river mouth:**

(501) **USX Corp., South Works, South Slip:** E side of the slip; 1,223-foot face; 18 to 30 feet alongside; deck height, 9 feet; 9 acres open storage; 30 ton gantry crane; shipment of billets, slabs, ingots and steel products; occasional receipt of machinery, equipment, and supplies; owned and operated by USX Corp.

(502) **Facilities along left descending bank of Calumet River:**

## Structures across Calumet River and Little Calumet River
### **Miles above North Pierhead Light*
### ***Clear width in feet proceeding upstream*

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Calumet River** | | | | | | | |
| 1 | Overhead cable | Power | 0.58 | | | | 146 | |
| 2 | Elgin, Joliet & Eastern Ry. bridge | Railroad | 0.62 | | | 200 | 7 | Vertical lift. Clearance up, 125 feet. Note 1. |
| 3 | 92nd St. bridge | Highway | 0.76 | | | 180 | 18 | Bascule. Note 1. |
| 4 | 95th St. bridge | Highway | 1.09 | | | 204 | 23 | Bascule. Note 1. |
| 5 | Overhead cable | Power | 1.33 | | | | 148 | |
| 6 | ConRail bridge | Railroad | 1.34 | | | 138 | 23 | Vertical lift. Permanently open. Clearance up 120 feet. Note 3. |
| 7 | ConRail bridge | Railroad | 1.36 | | | 138 | 23 | Vertical lift. Clearance up 120 feet. Notes 3 and 4. |
| 8 | Chicago Skyway bridge | Highway | 1.50 | | | 200 | 125 | Fixed. |
| 9 | Overhead cable | Power | 1.70 | | | | 155 | |
| 10 | Overhead cable | Power | 1.72 | | | | 155 | |
| 11 | 100th St. bridge | Highway | 1.78 | | | 186 | 17 | Bascule. Note 1. |
| 12 | 106th St. bridge | Highway | 2.58 | | | 195 | 17 | Bascule. Note 1. |
| 13 | Overhead pipeline and conveyor | | 3.36 | | | 166 | 130 | |
| 14 | Overhead cable | Power | 3.81 | | | | 145 | |
| | Turning Basin No. 3 | | 4.63 | | | | | |
| 15 | Overhead cable | Power | 5.10 | | | | 147 | |
| 16 | Chicago & Western Indiana RR bridge | Railroad | 5.24 | | | 200 | 22 | Vertical lift. Clearance up 125 feet. Note 1. |
| 17 | Torrence Ave. bridge | Highway | 5.26 | | | 200 | 22 | Vertical lift. Clearance up 125 feet. Note 1. |
| 18 | Norfolk Southern RR bridge | Railroad | 5.59 | | | 200 | 22 | Vertical lift. Clearance up 125 feet. Notes 1 and 2. |
| | Turning Basin No. 5 | | 6.06 | | | | | |
| 19 | 130th St. bridge | Highway | 6.25 | | | 219 | 29 | Fixed. |
| 20 | Overhead cable | Power | 6.26 | | | | 49 | |
| 21 | Overhead cable | | 6.30 | | | | 121 | |
| 22 | Chicago, South Shore & South Bend RR bridge | Railroad | 6.33 | | | 250 | 29 | Fixed. |
| 23 | Overhead cable | | 6.34 | | | | | Data not available. |
| | Thomas J. O'Brien Lock | | 6.84 | | | | | |
| | **Little Calumet River** | | | | | | | |
| 24 | ConRail bridge | Railroad | 7.92 | | | 250 | 24 | Fixed. |
| 25 | Overhead pipeline | Gas | 7.93 | | | | 25 | |
| 26 | I-94 bridge | Highway | 8.59 | | | 250 | 39 | Fixed. |
| 27 | Overhead cables | Power | 10.23 | | | | 64 | |
| 28 | Overhead cable | Power | 10.51 | | | | 88 | |
| 29 | Chicago & Western Indiana RR bridge | Railroad | 10.53 | | | 250 | 24 | Fixed. |
| 30 | Indiana Ave. bridge | Highway | 10.80 | | | 250 | 25 | Fixed. |
| 31 | Illinois Central Gulf RR bridge | Railroad | 10.97 | 71 | 300 | 300 | 25 | Fixed. |
| 32 | Illinois Central Gulf RR bridge | Railroad | 10.99 | 71 | 300 | 300 | 34 | Fixed. |

## Structures across Calumet River and Little Calumet River (Continued)

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 33 | Overhead cables | Power | 11.02 | | | | 38 | |
| 34 | Overhead cable | Power | 11.07 | | | | 63 | |
| 35 | ConRail bridge | Railroad | 12.49 | | | 250 | 24 | Fixed. |
| 36 | Overhead cable | Power | 12.50 | | | | 67 | |
| 37 | Overhead cable | Power | 12.99 | | | | 48 | |
| 38 | South Halsted St. bridge | Highway | 13.00 | | | 226 | 26 | Fixed. |
| | Junction with Calumet Sag Channel | | 13.48 | | | | | |
| 39 | Ashland Ave. bridge | Highway | 14.07 | 50 | 50 | | 26 | Fixed. |
| 40 | Dan Ryan Expressway (I–57) bridge | Highway | 14.12 | | | 145 | 42 | Fixed. |
| 41 | Riverdale Rd. (Blue Island) bridge | Highway | 14.47 | | | 52 | | Fixed. Site of old stone dam. |

Note 1.–See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.
Note 2.–Bridge is kept in the open position except for the passage of a train.
Note 3.–See **33 CFR 117.1 through 117.59 and 117.389,** chapter 2, for drawbridge regulations.
Note 4.–Mariners requiring the opening of the ConRail bridge at mile 1.36 over Calumet River are requested to contact the bridgetender at least 30 minutes prior to their intended time of passage through the draw.

(503) **Rail to Water Transfer Corp., Loading Dock:** immediately above E 100th Street bridge; 1,462 feet of berthing space; 27 to 31 feet alongside; deck height, 7 feet; 9 acres open storage; two loading towers, over 3,000 tons per hour each; shipment of coal, and bentonite clay; owned by Rail to Water Transfer Corp. and The Belt Railway Co. of Chicago; and operated by Rail to Water Transfer Corp.

(504) **Rail to Water Transfer Corp., Barge Unloading Slip:** nner part of N side of Slip No. 2, 2 miles above river mouth; ,565-foot face; 17 to 21 feet alongside; deck height, 7 feet; 10 cres open storage; two crawler cranes; eight 9- to 22-cubic yard ront-end loaders; receipt of coal and coke; owned and operated by ail to Water Transfer Corp.

(505) **Material Service Corp., Yard No. 20 Dock:** S side of ip No. 3; 1,327-foot face; 15 to 20 feet alongside; deck height, 7 et; 8 acres open storage; receipt and shipment of dry bulk comodities; owned by Material Service Corp.; operated by Material rvice Corp. and Coke Contracting Co., Inc.

(506) **General Mills, Rialto Grain Elevator Dock:** inner part the N side of Slip No. 4; 854 feet of berthing space; 20 feet ongside; deck height, 7 feet; 2¾-million-bushel grain elevator d annex; one marine leg, unloading rate 20,000 bushels per ur; one vessel-loading spout, rate 20,000 bushels per hour; ceipt and shipment of grain; owned and operated by General ills, Inc.

(507) **Beemsterboer Slag and Ballast Wharf:** outer part of the side of Slip No. 4; 1,020-foot face; 21 feet alongside; deck ight, 7 feet; 30 acres of open storage; receipt of coal, shipment coke; owned by George J. Beemsterboer, Inc. and operated by emsterboer Slag and Ballast Corp.

(508) **Continental Grain Co., Elevator B Dock:** W side of the ver 1 mile above Slip No. 4, 1,050-foot face; 27 feet alongside; ck height, 8 feet; 7½-million-bushel grain elevator; two marine legs, combined unloading rate 20,000 bushels per hour; five vessel-loading spouts, average combined rate 40,000 bushels per hour; receipt and shipment of grain; owned and operated by Continental Grain Co.

(509) **Cargill Chicago Grain Dock:** W side of the river opposite Turning Basin No. 3; 1,145-foot face with additional 695 feet of berthing space immediately downstream; 25 to 29 feet alongside; deck height, 9 feet; 20-million-bushel grain elevator; one marine leg, unloading rate 11,000 bushels per hour; five vessel-loading spouts, combined rate 50,000 bushels per hour; receipt and shipment of grain; owned and operated by Cargill, Inc.

(510) **Cargill Vegetable Oil and Salt Dock:** immediately above Cargill Chicago Grain Dock; 690 feet of berthing space with dolphins; 14 to 27 feet alongside; deck height, 9 feet; open storage for 50,000 tons of salt; tank storage for over 18 million gallons of molasses and over 1½ million gallons of soybean oil; receipt of molasses and salt, shipment of soybean oil; owned and operated by Cargill, Inc.

(511) **Facilities on the right descending bank of the Calumet River:**

(512) **Ceres Terminals, Iroquois Landing Wharf:** S side of the river mouth; 2,825 feet of berthing space; 25 to 27 feet alongside; deck height, 9 feet; 210,000 square feet covered storage; 80 acres open storage; cranes to 200 tons; receipt and shipment of general and containerized cargo, steel products, structural steel, and vehicles; owned by Illinois International Port and operated by Ceres Terminals.

(513) **Federal Marine Terminals, North Dock:** S side of Turning Basin No. 1 and along river immediately downstream; 671-foot face in basin, 23 to 27 feet alongside; deck height, 9 feet; 426 feet of berthing space along river, 17 to 25 feet alongside, deck height, 7 feet; about 66,000 square feet covered storage; 12 acres open storage; cranes to 200 tons; receipt and shipment of general

and containerized cargo, finished steel products, vehicles, and dry bulk commodities; owned and operated by Federal Marine Terminals, Inc.

(514) **Marblehead Lime Co. North Dock:** 0.3 mile below E 106th Street bridge; 929 feet of berthing space; 18 to 28 feet alongside; deck height, 9 feet; 5 acres open storage; receipt of limestone; owned and operated by Marblehead Lime Co.

(515) **Marblehead Lime Co. South Dock:** immediately below E 106th Street bridge; 1,030-foot face; 23 to 27 feet alongside; deck height, 7 feet; 5½ acres open storage; receipt of limestone; owned and operated by Marblehead Lime Co.

(516) **Interlake Furnace Plant, North Dock:** about 0.5 mile above E 106th Street bridge; 1,146 feet of berthing space; 22 to 29 feet alongside; deck height, 10 feet; open storage for 325,000 tons of iron ore; two unloading cranes, combined rate 600 tons per hour; receipt of iron ore pellets; owned and operated by Interlake, Inc.

(517) **Interlake Furnace Plant, South Dock:** immediately above Interlake Furnace Plant, North Dock; 1,187-foot face; 22 to 29 feet alongside; deck height, 7 and 9 feet; open storage for 900,000 tons of material; two unloading cranes, combined rate 1,850 tons per hour; receipt of iron ore, iron ore pellets, and limestone; shipment of pig iron; owned and operated by Interlake, Inc.

(518) **LTV Steel Co., Ore Dock:** immediately above Interlake Furnace Plant, South Dock; 2,288-foot face; 25 to 29 feet alongside; deck height, 11 feet; 13 acres open storage; two hulett-type ore unloaders, combined rate 2,200 tons per hour; receipt of iron ore, limestone, coking coal, ferrous scrap, and pig iron; shipment of steel products; owned and operated by LTV Steel Co.

(519) **Marathon Pipe Line Co., Calumet River Terminal Wharf:** SE side of the river .03 mile below Turning Basin No. 5; 750-foot face; 16 to 28 feet alongside; deck height, 8 feet; pipelines extend to tank storage for over 1 million barrels; occasional shipment of petroleum products; owned and operated by Marathon Pipe Line Co.

(520) **C-I-L Chemicals Wharf:** E side of Turning Basin No. 5; 150 feet of berthing space; 22 feet alongside; deck height, 8 feet; receipt and shipment of sulfuric acid; owned and operated by C-I-L Chemicals, Inc.

(521) **Scrap Corp. of America, Butler Dock:** SW side of Turning Basin No. 5; 740-foot face; 27 feet alongside; deck height, 6 to 7 feet; shipment and occasional receipt of scrap metal; owned and operated by Scrap Corp of America.

(522) **Facilities in Lake Calumet and its entrance channel:**

(523) **Scrap Corp. of America, Pennsylvania Dock:** S side of entrance channel immediately above Turning Basin No. 5; 930-foot face; 27 feet alongside; deck height, 6 to 7 feet; 10 acres open storage; receipt and occasional shipment of scrap metal; owned and operated by Scrap Corp. of America.

(524) **Ceres Lake Calumet Harbor South Terminal, Shed No. 3 Wharf:** S side of entrance channel immediately above Pennsylvania Dock; 1,034 feet of berthing space; 27 feet alongside; deck height, 8 feet; 72,000 square feet covered storage; 10 acres open storage; cranes to 150 tons; receipt and shipment of general and containerized cargo, automobiles, scrap metal, and other dry bulk commodities; owned by Illinois International Port and operated by Ceres Terminals, Inc.

(525) **Lake Calumet Harbor, Shed No. 2 Wharf:** immediately above Shed No. 3 Wharf; 660-foot face; 27 feet alongside; deck height, 8 feet; 72,000 square feet covered storage; cranes to 25 tons; moorage of pilot boat and company-owned tugboats, launching and retrieving pleasure craft; owned by Illinois Internationa Port and operated by Lakeland Marina Storage, Inc. and North American Towing Co.

(526) **Ceres Lake Calumet Harbor South Terminal, Shed No. 1 Wharf:** immediately above Shed No. 2 Wharf; 1,777-foot face; 27 feet alongside; deck height, 8 feet; 173,000 square feet covered storage; cranes to 150 tons; receipt and shipment of conventional and containerized general cargo, various bulk commodities and steel products; owned by Illinois International Port and operated by Ceres Terminals, Inc.

(527) **Indiana Grain Division, Gateway Elevator Dock:** S side of Lake Calumet Slip No. 1; 1,000-foot face; 27 feet alongside; deck height, 6 feet; 7¾-million-bushel grain elevator; two marine legs, combined unloading rate 20,000 to 24,000 bushels per hour; eight vessel-loading spouts, combined rate 70,000 bushels per hour; receipt and shipment of grain; owned by Illinois International Port and operated by Indiana Grain Division of Indiana Farm Bureau Cooperative.

(528) **Continental Grain Co., Elevator C Wharf:** N side of Lake Calumet Slip No. 1; 1,020-foot face; 27 feet alongside; deck height, 6 feet; 6¾-million-bushel grain elevator; two marine legs, combined unloading rate 20,000 to 24,000 bushels per hour; eight vessel-loading spouts, combined rate 60,000 bushels per hour; receipt and shipment of grain; owned by Illinois International Port and operated by Continental Grain Co.

(529) **Ceres Lake Calumet Harbor North Terminal Wharf:** N side of Lake Calumet entrance channel 0.25 mile above Turning Basin No. 5; 1,840 feet of berthing space with dolphins; 23 to 28 feet alongside; deck height, 6 feet; 110,600 square feet covered storage; 30 acres open storage; tank storage for 2,000 tons of lime; cranes to 65 tons; receipt and shipment of steel products; receipt of various bulk materials including ore and lime; owned by Illinois International Port and operated by Ceres Illinois, Inc.

(530) **Stolt Terminals, Docks A and B:** 0.25 mile above Ceres Lake Calumet Harbor North Terminal Wharf; southeasternmost Dock A, 545 feet of berthing space with dolphins, 27 to 28 feet alongside; Dock B, 675 feet of berthing space with dolphins, 23 to 26 feet alongside; deck height, 6 feet; tank storage for 610,000 barrels; receipt and shipment of petroleum products, chemicals, petrochemicals, animal fats, vegetable oils, and other bulk liquids; owned by Illinois International Port and operated by Stolt Terminals (Chicago), Inc.

(531) **EmEsCo Marine Terminal:** Lake Calumet Slip No. 2; S side, 1,300 feet of berthing space; N side, 1,425 feet of berthing space; 27 feet alongside; deck height, 8 feet; 30,000 square feet covered storage; 41 acres open storage; two 60-ton cranes can handle 120 tons in tandem; receipt and shipment of general cargo and dry bulk materials; owned by Illinois International Port and operated by EmEsCo.

(532) **Medusa Cement Co., Chicago Distribution Terminal Dock:** Lake Calumet Slip No. 3, north side; 620-foot permanently moored vessel used as bulk cement storage and transfer facility; 30 feet alongside; deck height, 10 to 25 feet; storage for 20,000 tons of bulk cement; conveyor system for transferring bulk cement to truck loading bins; owned and operated by Cement Transit Co., a subsidiary of Medusa Cement Co.

(533) **Supplies.**–Complete marine supplies and services are available. Bunker C and diesel fuel are delivered by barge or tank truck. Water is available at many of the wharves.

(534) **Repairs.**–A graving dock of the American Ship Building Co. is on the E side of the Calumet River just above the E 100th Street bridge. The drydock has a clear length inside at the top of 727 feet, with a width of 78 feet on the sill at the entrance and 87 feet at the top. The depth over the sill is 17 feet at Low Water

Datum. The shipyard performs all types of above- and below-the-waterline repairs.

(535) **Small-craft facilities.**–There are no facilities for small craft on the Calumet River below the Thomas J. O'Brien Lock.

(536) **Communications.**–Calumet Harbor is served by several major rail lines, several interstate highways, and three airports for passenger and freight service.

(537) **Charts 14927, 14926.**–From Calumet Harbor N for 11 miles to the mouth of the Chicago River, the shore is bordered by shoals, detached shoal spots, and submerged wrecks extending about 4 miles off. A wreck, covered 13 feet and marked by a buoy, is about 0.3 mile N of the Calumet Harbor breakwater gap. **Clark Point Shoal,** 1.2 miles N of Calumet Harbor breakwater and marked on the outer end by a buoy, has depths of 5 to 9 feet extending about 0.7 mile from shore. A wreck, covered 19 feet, is 1 mile NNE of Clark Point Shoal.

(538) Chicago South District Filtration Plant is on a bulkheaded fill area 1.5 miles NW of the Calumet Harbor breakwater. The plant is protected by a detached breakwater marked on either end by a private light. The area between the breakwater and the plant and the area within 150 feet of the plant's SE bulkhead is a **no mooring-restricted area.** A jetty and a submerged dike, covered 6 feet, extend 0.5 mile NW from the plant to enclose a bathing beach.

(539) **Jackson Park Harbor,** 2 miles NW of the water filtration plant, is a small-craft refuge comprising an outer harbor and an inner harbor. The entrance to the harbor is protected on the N side by a pier that extends 0.2 mile ENE and bends N for 0.2 mile. In May 1982, it was reported that the outer end of the pier had collapsed into the lake; caution is advised. The bend of the pier is marked by a light. The entrance to the harbor, marked on either side by a private light, has depths of about 3 feet. Outer Harbor (Outer Lagoon) has depths of 6 to 10 feet with shoaling within 150 feet of shore. A narrow channel with depths of 6 feet leads to Inner Harbor (Inner Lagoon). A fixed highway bridge with a clearance of 11 feet crosses the channel. A footbridge of unknown clearance crosses the channel on the E side of the highway bridge. Inner Harbor has depths of about 7 feet. Transient berths, gasoline, water, ice, a launching ramp, and sewage pump-out facilities are available in the harbor.

(540) **Fifty-ninth (59th) Street Harbor,** about 0.6 mile N of Jackson Park Harbor, is entered between parallel piers. The outer ends of the piers are marked by private lights. In 1979, depths of 10 feet were reported in the entrance channel with 5 feet in the basin. A fixed highway bridge with a clearance of 10 feet crosses the entrance channel. Transient berths and launching ramps are available in the basin.

(541) **South Park Shoal,** with a least depth of 7 feet and marked on the E side by a buoy, is 1.7 miles ENE of the entrance to 59th Street Harbor. **Madison Park Shoal,** with a depth of 13 feet, is 1.2 miles NE of 59th Street Harbor. **Clemson Shoal,** a rock ledge covered 18 feet, is marked on the E side by a lighted bell buoy 0.6 mile NE of South Park Shoal. **Hyde Park Outer Shoal,** covered 8 feet and marked on the E side by a buoy, is 0.7 mile N of South Park Shoal and 0.4 mile NW of Clemson Shoal. **Morgan Shoal,** with an obstruction covered 1 foot, extends 0.7 mile offshore about 1.4 miles N of 59th Street Harbor. A buoy marks the S side of the shoal. **Hyde Park Inner Shoal,** covered 11 feet, is 0.4 mile of the outer end of Morgan Shoal. **Oakland Shoal,** with a least depth of 7 feet, extends 0.5 mile from shore about 1 mile N of Morgan Shoal.

(542) **Burnham Park Harbor,** a small-craft basin 2 miles S of the mouth of Chicago River, is enclosed on the E by Northerly Island. **Northerly Island** is an artificial island, attached at the N end to the mainland by a causeway which closes the N end of Burnham Park Harbor. The entrance to the harbor, from S, is marked by a private light on shore SW of the S end of Northerly Island and has a depth of about 16 feet. The harbor has central depths of about 15 feet with shoaling to less than 6 feet toward the E shore and depths of 7 to 10 feet along the piers on the W side of the harbor. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, a launching ramp, and hoists are available in the harbor.

(543) A **danger zone** marked by private buoys extends from the S end of the airfield on Northerly Island S across the entrance to Burnham Park Harbor. (See **33 CFR 334.840,** chapter 2, for limits and regulations.)

(544) A bathing beach protected by a submerged dike, covered 1 foot, is on the E side of the N end of Northerly Island. Vessels should not attempt to enter the bathing beach area.

(545) From Northerly Island N to the entrance to Chicago River, numerous scattered shoal spots with depths of 10 to 24 feet are within about 2.5 miles of shore.

(546) **A safety and security zone** has been established over all waters and shoreline areas within 1000 yards of the shoreline surrounding Merrill C. Meigis Airfield. (See **165.1 through 165.7, 165.20 through 165.33, and 165.904**, chapter 2, for limits and regulations.)

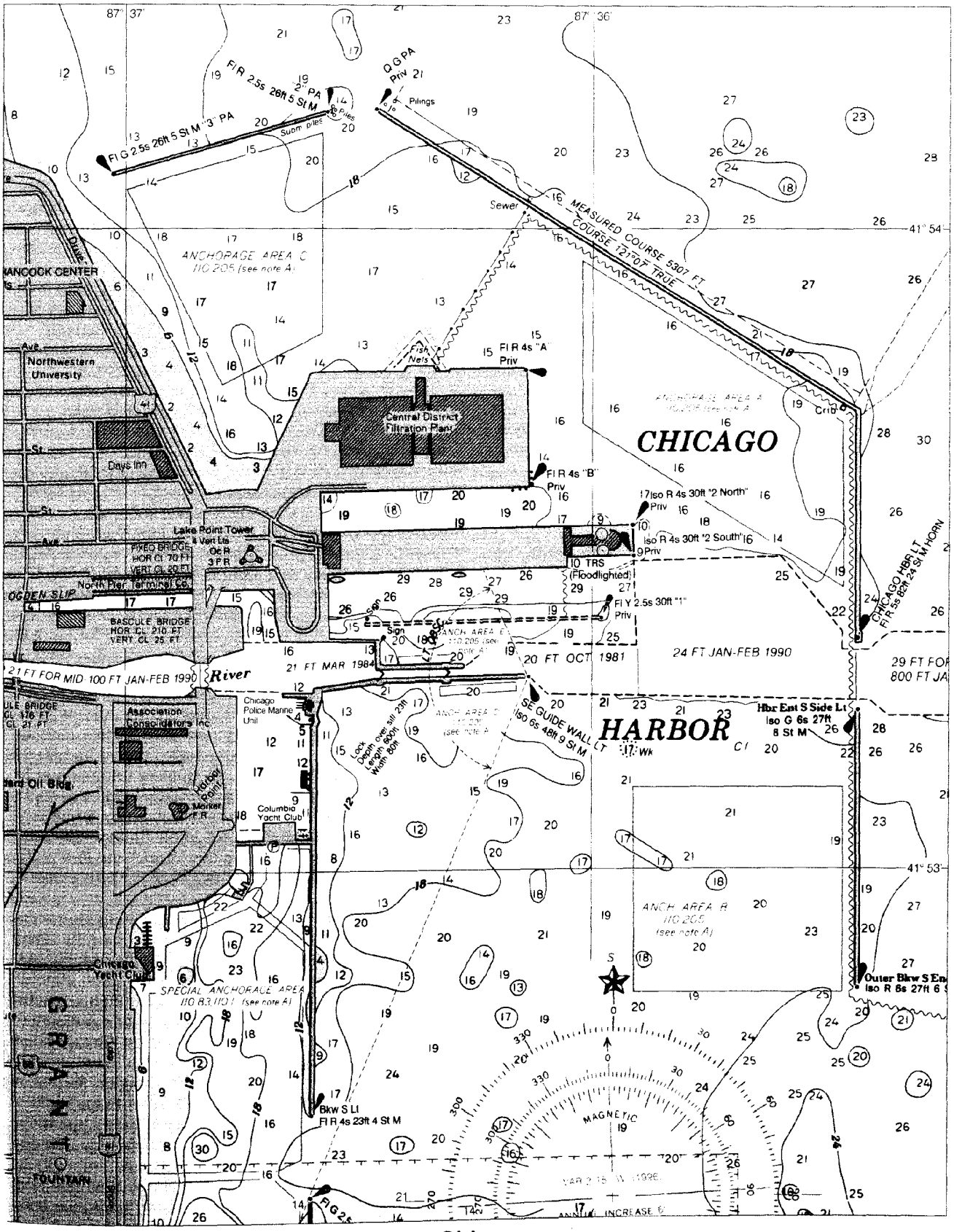
(547) **Charts 14905, 14927, 14928, 14926.–Chicago Harbor,** on the SW shore of Lake Michigan 11 miles N of Calumet Harbor, serves the city of **Chicago, Ill.,** and along with Calumet Harbor, forms one of the largest inland ports in the world. The harbor comprises an outer harbor with outer and inner basins and an inner harbor formed by the **Chicago River** and its branches. While there is some deep-draft traffic in the harbor, barge traffic from the Mississippi River via the Illinois Waterway constitutes the major use of Chicago Harbor. The major commodities handled at the deep-draft facilities in the harbor are general cargo, newsprint, salt, and cement.

(548) **Prominent features.**–The skyline of Chicago is prominent in general, and its three tallest buildings are conspicuous. The 1,454-foot Sears Tower, 1.3 miles SW of the river mouth, is reported to be the tallest building in the world. Its top is usually obscured by any fog or inclement weather. The white 1,136-foot Standard Oil building is 0.5 mile SW of the river mouth. The dark brown trapezoidal 1,107-foot John Hancock Center 0.9 mile NW of the river mouth has two prominent lighted towers on its roof.

(549) **Chicago Harbor Light** (41°53.4′N., 87°35.4′W.), 82 feet above the water, is shown from a white conical tower on the S end of the breakwater on the N side of the entrance channel.

(550) **Channels.**–The harbor consists of an outer harbor of refuge protected by breakwaters on the NE and E sides and an inner basin at the natural mouth of the Chicago River. The inner basin is protected by breakwaters and bulkheads. The outer harbor is entered from Lake Michigan through a dredged entrance channel leading W between the NE and E breakwaters. The entrance channel is marked by buoys, and the ends of the breakwaters are marked by lights. The outer harbor affords access to the municipal pier on the W side of the harbor and to the entrance channel to the inner basin. A 400-foot-wide breakwater gap at the N end of the outer harbor is marked by lights. The end of the breakwater on the E side of the gap is partially submerged. Caution should be exercised when transiting the gap.

## Chicago, IL




**Chicago**

**Use Chart 14926 for Navigation**

(551) The inner basin, on the S side of the mouth of Chicago River, is entered from the W side of the outer harbor through the **Chicago Lock.** The SE guide wall of the lock is marked at the outer end by a light and fog signal. The inner basin and the river may only be entered through the lock, as bulkheads attach the inner end of the lock to shore and to the inner breakwater, and a bulkhead extending from the shore to the inner breakwater separates the inner basin from the small-craft basin SW of the outer harbor. The dredged river entrance channel extends from the lock across the N side of the inner basin through the mouth of the river upstream to Rush Street.

(552) Depths in the inner basin and river entrance shoreward of the Chicago Lock are referred to normal pool level, which is 0.6 foot below Low Water Datum, the plane of reference used in the outer harbor and elsewhere on Lake Michigan.

(553) In January-February 1990, the controlling depths were 29 feet in the approach channel; thence 24 feet in the N part of the outer harbor in the approach to Navy Pier and 26 feet in the S part of the outer basin in the approach to Chicago Lock; thence, in 1981, 21 feet in the S half of the channel and 19 feet in the N half of the channel from the outer harbor to the lock; thence, in January-February 1990, 21 feet for midwidth of 100 feet from the lock through the mouth of the river upstream to Rush Street.

(554) Navigators are cautioned against navigating outside the channel limits in the vicinity of structures protected by stone riprap.

(555) **Ogden Slip,** at the N end of the inner basin, is N of and parallel to the mouth of the Chicago River. The slip extends about 0.4 mile into the shoreline, and in 1977, had a centerline controlling depth of 16 feet except for shoaling at the W end.

(556) From its mouth, the Chicago River leads W for 1.3 miles to the junction of North Branch and South Branch. From the junction, **North Branch** leads NNW for 1 mile to the junction with **North Branch Canal,** thence these two channels continue NNW, separated by Goose Island, and rejoin at a turning basin at North Avenue. South Branch extends 4 miles S and SW to the junction with **South Fork** and continues SW for 0.8 mile to the Chicago Sanitary and Ship Canal. South Fork extends 1.3 miles S from South Branch.

(557) A Federal project provides for dredged channels in the Chicago River from its mouth to the junction with the North and South Branches, thence in North Branch and North Branch Canal to the turning basin at North Avenue.

(558) In August-September 1990, the midchannel controlling depth was 19 feet in the Chicago River from Rush Street to the junction with the North Branch; thence the midchannel controlling depths were 15 feet to the junction with North Branch and North Branch Canal; thence the midchannel controlling depth in North Branch was 12 feet to the turning basin with depths of 9 to 12 feet in the SE part of the basin and 5 to 8 feet in the NW part of the basin except for shoaling to less than 3½ feet along the W edge, and 4 feet along the SE edge. The midchannel controlling depth in the North Branch Canal was 9 feet to the Ogden Avenue bridge, thence decreasing from 9 to 4 feet to the turning basin.

(559) The city of Chicago has improved the channel in North Branch N of the turning basin at North Avenue bridge. In 1977, the centerline controlling depth was 6 feet from the turning basin upstream to Addison Street bridge. In 1957, the channel from Addison Street bridge to Foster Avenue, just inside the S end of North Shore Channel, was dredged to a depth of 8 feet.

(560) The city of Chicago has also improved the channel in South Branch to the South Damen Avenue bridge, including turning basins at the junction with South Fork and on the W side of the South Damen Avenue bridge. In 1977, the centerline controlling depths were 20 feet at midchannel to the Baltimore and Ohio Chicago Terminal Railroad bridge at mile 3.64, thence 15 feet to the turning basin at the juction with South Fork, thence 3 to 14 feet in the basin with the best water on the E side, thence 19 feet on the centerline to the South Damen Avenue bridge with 8 to 23 feet in the basin on the W side of the bridge. Obstructions not disclosed by the soundings may exist in these channels.

(561) South Fork is badly fouled with oily waste. In June 1980, the reported controlling depth was 6 feet to the 35th Street bridge. Obstructions not disclosed by the soundings may exist.

(562) **North Shore Channel** joins North Branch about 5.5 miles above the turning basin at North Avenue and extends about 8 miles N to the harbor at Wilmette, Ill. The controlling depth in the channel is about 7 feet. A lock which blocks the channel at Wilmette is inoperable and is closed to all navigation.

(563) **Measured course.**–A 121°-301° **measured course**, 5,307 feet long, is on the lakeward side of the breakwater on the NE side of the outer harbor. The markers are one vertical white stripe between two vertical red stripes, painted on the breakwater.

(564) **Lock.**–The Chicago Lock, operated by the U.S. Army Corps of Engineers, at the mouth of the Chicago River was constructed to prevent the flow of the river into the lake. The lock is 600 feet long and 80 feet wide with a depth of 23 feet over the sill. The zero of the water level gages set in the lock walls is at **Chicago City Datum**, which is 1.4 feet above Low Water Datum. A sound amplifier system is maintained by the lock operators for communication with vessel operators. (See **33 CFR 207.420,** chapter 2, for lock signals and regulations.) Vessels within the lock normally tie up to the S lock wall. However, under adverse weather conditions, such as strong S winds, vessels may wish to use the N lock wall.

(565) Ice may, at times, prevent full opening of the sector gates at the Chicago Lock. When the gates cannot be fully opened (due to ice build-up in the recessed areas), they are vulnerable to excessive damage from vessels entering or departing the lock chamber. When barges have ice build-up on their sides and considerable ice flows are present in the channel, the width of the tows may be restricted by the lockmaster to facilitate passage of the tow into the lock chamber and to minimize lock structural damage from ice.

(566) Due to the lock at the mouth of the Chicago River and other projects by the Chicago Sanitary District, the flow of the river has been reversed and is now away from the lake, except in North Branch.

(567) **Anchorages.**–General and small-craft anchorages are in Chicago outer harbor and in the small-craft basin at the SW corner of the outer harbor. (See **33 CFR 110.1, 110.83, and 110.205,** chapter 2, for limits and regulations.)

(568) **Danger.**–A rock-filled pile pier 3 to 6 feet high, marked at the outer end by a private light, extends 0.5 mile E from shore into the outer harbor, parallel to and 400 feet N of the Chicago River entrance lock.

(569) **Caution.**–Submerged wrecks are along the W side of North Branch Canal about 0.4 and 0.8 mile above the junction with North Branch. The northernmost wreck is marked by a buoy.

(570) Four Mile Crib, marked by a private light with a fog signal, is 2.6 miles ESE of Chicago Harbor Light.

(571) **Bridges.**–The city has instituted a system of roving bridgetenders to operate or to assist the resident tender to operate certain bridges across the Chicago River, the North Branch, and the South Branch. The bridges affected are annotated in the tables of bridges, following. At least 30 minutes advance notice is required for the first bridge through which a vessel intends to pass.

Thence, telephone advice of vessel movements will be passed from bridge to bridge. Notice may be given to the Bridge Desk of the Chicago Department of Public Works, telephone, 744–4200/4201.

(572) The city of Chicago is attempting to minimize noise in the area bounded by the Michigan Avenue bridge on the E, the Chicago Avenue bridge on the N, and the Roosevelt Road bridge on the S. Pilots of vessels should give the customary whistle signal for the first bridge approached within this area and, when in the draw of the bridge, should inform the bridgetender of their destination. The bridgetenders will then telephone ahead for the necessary bridge openings. Pilots are asked not to signal for other bridge openings in this area unless prompt service is not provided.

(573) **Submarine tunnels.**–Numerous submarine tunnels cross Chicago River and its branches.

(574) **Weather, Chicago and vicinity.**–Chicago, IL, is located on the extreme southwestern shore of Lake Michigan and in the northeastern portion of the state. The location averages about 18 days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 84°F (28.9°C) and an average minimum of 63°F (17.2°C). January is the coolest month with an average high of 29°F (-2°C) and an average minimum of 14°F (-10°C). The highest temperature on record for Chicago is 104°F (40°C) recorded in June 1988 and July 1995 and the lowest temperature on record is -27°F (-32.8°C) recorded in January 1985. About 132 days each year experience temperatures below 32°F (0°C) and an average twenty days each year records temperatures below 5°F (-15°C). Every month has seen temperatures at or below 41°F (5°C) and every month except June, July, and August has recorded temperatures below freezing (0°C).

(575) The average annual precipitation for Chicago is 35.25 inches (895 mm). An annual maximum occurs during the summer, due mainly to convective activity, and a marked dry period occurs during the winter months. Precipitation falls on about 190 days each year. The wettest month is August with 4.10 inches (104 mm) and the driest, February, averages only 1.37 inches (34.8 mm). An average of 37 thunderstorm days occur each year with une, July and August being the most likely months. Snow falls n about 68 days each year and averages about 38 inches (965 m) each year. January averages about ten inches (254 mm) per ear and December averages about eight inches (203 mm) each ear. Ten-inch (254 mm) snowfalls in a 24-hour period have curred in each month December, January, February and April. bout seven days each year has a snowfall total greater than 1.5 ches (38 mm) and snow has fallen in every month except June rough September. Fog is present on average 131 days each year d is rather evenly distributed throughout the year with a slight aximum during the winter season.

576) The prevailing wind direction in Chicago is the southuthwest. The average wind speed is nine knots. Winter through rly spring is the windiest period and a maximum gust of 73 ots occurred in March 1991.

577) (See page T-11 for **Chicago climatological table.**)

578) **Towage.**–Tugs for the Chicago area are available from lumet (South Chicago) Harbor. (See Towage under Calumet uth Chicago) Harbor.)

579) Chicago is a **customs port of entry.**

80) **Quarantine, customs, immigration, and agricultural arantine.**–(See chapter 3, Vessel Arrival Inspections, and pendix for addresses.)

81) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) A U.S. Public Health Service **outpatient clinic** is in Chicago. (See appendix for address.)

(582) **Coast Guard.**–A Coast Guard **Captain of the Port** is in Burr Ridge, Ill. (See appendix for address.) U.S. Coast Guard Air Station, Chicago, is at Glenview, Ill., about 17 miles NW of the mouth of the Chicago River and about 7.5 miles W of Wilmette Harbor. The air station supports Coast Guard surface operations, carries out search and rescue missions, and renders airborne assistance. The air station can be contacted through the nearest Coast Guard station.

(583) **Wharves.**–The principal use of Chicago Harbor is by barges which reach the port from the Mississippi River via the Illinois Waterway. There are about 100 facilities for barges in the harbor. Only the deep-draft facilities in the harbor are described here. (For complete information on the port facilities, refer to Port Series No. 46, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) All the facilities described have highway and rail connections, and some have water and electrical shore-power connections.

(584) **Morton Salt, Elston Avenue Wharf:** W side of North Branch, 0.25 mile below North Avenue turning basin; 532-foot face; 14 to 18 feet alongside; deck height, 8 to 12 feet; warehouse storage for 25,000 tons of salt; receipt of salt; owned and operated by Morton Salt Co.

(585) **Klemp Corp. Wharf:** E side of North Branch just below North Avenue turning basin; 397-foot face; 13 to 17 feet alongside; deck height, 8 feet; rental cranes available; occasional receipt of steel sheets and structural shapes; owned and operated by Klemp Corp.

(586) **Dundee Cement Co., Chicago Wharf:** E side of North Branch 650 feet above Ogden Avenue bridge; 217-foot face; 15 to 18 feet alongside; deck height, 7 feet; silo storage for 25,000 tons of cement; receipt of bulk cement; owned and operated by Dundee Cement Co.

(587) **International Salt Co. Dock:** E side of North Branch below Ogden Avenue bridge; 518-foot face; 16 to 21 feet alongside; deck height, 10 feet; covered storage for 8,000 tons of salt; open storage for 7,000 tons of salt; receipt of salt; owned and operated by International Salt Co.

(588) **Central District Filtration Plant** is on a bulkheaded fill area just N of Navy Pier. The outer ends of the bulkheads are marked by private lights. An area of fish nets, marked by private lighted buoys and floodlighted, adjoins the N bulkhead of the filtration plant.

(589) **Supplies.**–All types of marine supplies and provisions are available at Calumet Harbor. Tank vessels provide bunker fuel to vessels at their berths.

(590) **Repairs.**–The nearest facility for repairs to deep-draft vessels is in Calumet Harbor. Lemont Shipbuilding and Repair Co. has a 2,500-ton vertical lift and makes above- and below-the-waterline repairs to towboats at its facility on the Chicago Sanitary and Ship Canal about 4 miles W of the junction with Calumet Sag Channel. Henry C. Grebe and Co. has a 75-ton marine railway for vessels to 80 feet long on the W side of North Branch about 3 miles above North Avenue turning basin. Above- and below-the-waterline hull repairs and engine repairs are made.

(591) **Small-craft facilities.**– A small-craft basin, protected by breakwaters, is entered from eastward through an opening in the breakwaters about 0.9 mile S of the natural entrance of the Chicago River. The entrance to the basin is marked by lights. Gasoline, diesel fuel, water, ice and launching ramps are available.

## Structures across Chicago River and its Branches
### *Miles above W end of Chicago Lock (41°53′18″N., 87°36′28″W.)
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Main River** | | | | | | | |
| | Ogden Slip | | 0.22 | | | | | |
| 1 | Lake Shore Drive bridge | Highway | 0.32 | | | 210 | 25 | Bascule. Note 1. |
| 2 | Lake Shore Drive bridge (over Ogden Slip) | Highway | 0.42 | | | 70 | 20 | Fixed. |
| 3 | Columbus Drive bridge | Highway | 0.67 | | | 176 | 21 | Bascule. Note 1. |
| 4 | Michigan Ave. Bridge | Highway | 0.85 | | | 195 | 17 | Bascule. Notes 1 and 2. |
| 5 | Wabash Ave. bridge | Highway | 0.98 | | | 192 | 22 | Bascule. Notes 1 and 3. |
| 6 | State St. bridge | Highway | 1.05 | | | 200 | 21 | Bascule. Note 1. |
| 7 | Dearborn St. bridge | Highway | 1.13 | | | 200 | 22 | Bascule. Note 1. |
| 8 | Clark St. bridge | Highway | 1.21 | | | 195 | 19 | Bascule. Notes 1 and 2. |
| 9 | La Salle St. bridge | Highway | 1.29 | | | 195 | 18 | Bascule. Notes 1 and 2. |
| 10 | Wells St. bridge | Highway & Railroad | 1.37 | | | 219 | 18 | Bascule. Note 1. |
| 11 | Franklin-Orleans St. bridge | Highway | 1.47 | | | 190 | 18 | Bascule. Notes 1 and 3. |
| | **South Branch** | | | | | | | |
| 12 | Lake St. bridge | Highway & Railroad | 1.64 | | | 206 | 18 | Bascule. Note 1. |
| 13 | Randolph St. bridge | Highway | 1.73 | | | 100 | 22 | Bascule. Note 1. |
| 14 | Washington St. bridge | Highway | 1.81 | | | 155 | 20 | Bascule. Notes 1 and 3. |
| 15 | Madison St. bridge | Highway | 1.90 | | | 168 | 18 | Bascule. Notes 1 and 3. |
| 16 | Monroe St. bridge | Highway | 1.99 | | | 156 | 18 | Bascule. Notes 1 and 3. |
| 17 | Adams St. bridge | Highway | 2.08 | | | 148 | 19 | Bascule. Notes 1 and 3. |
| 18 | Jackson Blvd. bridge | Highway | 2.17 | | | 143 | 20 | Bascule. Notes 1 and 3. |
| 19 | Van Buren St. bridge | Highway | 2.26 | | | 166 | 22 | Bascule. Notes 1 and 3. |
| 20 | Eisenhower Expressway bridge | Highway | 2.35 | | | 168 | 22 | Bascule. Note 1. |
| 21 | Harrison St. bridge | Highway | 2.44 | | | 159 | 22 | Bascule. Notes 1 and 3. |
| 22 | Polk St. bridge | Highway | 2.61 | | | 130 | | Bridge leaves removed. Abutments remain. |
| 23 | Roosevelt Rd. bridge | Highway | 2.94 | | | 170 | 16 | Bascule. Notes 1 and 3. |
| 24 | Baltimore & Ohio Chicago Terminal RR bridge | Railroad | 3.36 | | | 171 | 21 | Bascule. Notes 1 and 3. |
| 25 | ConRail bridge | Railroad | 3.38 | | | 200 | 22 | Bascule. Note 1. |
| 26 | 18th St. bridge | Highway | 3.60 | | | 125 | 22 | Bascule. Notes 1 and 3. |
| 27 | Amtrak bridge | Railroad | 3.77 | | | 156 | 10 | Vertical lift. Clearance up 65 feet. Notes 1 and 8. |
| 28 | Canal St. bridge | Highway | 3.88 | | | 167 | 22 | Bascule. Notes 1 and 3. |
| 29 | Cermak Rd. bridge | Highway | 4.05 | | | 140 | 17 | Bascule. Note 1. |
| 30 | Dan Ryan Expressway bridge | Highway | 4.36 | | | 170 | 63 | Fixed. |
| 31 | South Halsted St. bridge | Highway | 4.47 | | | 163 | 21 | Bascule. Notes 1 and 3. |
| 32 | South Throop St. bridge | Highway | 5.08 | | | 131 | | Bridge removed. Abutments remain. |
| 33 | South Loomis St. bridge | Highway | 5.29 | | | 144 | 22 | Bascule. Notes 1, 3, and 6. |
| | Junction with South Fork | | 5.49 | | | | | |
| 34 | South Ashland Ave. bridge | Highway | 5.57 | | | 183 | 21 | Bascule. Notes 1 and 3. |
| 35 | South Damen Ave. bridge | Highway | 6.14 | | | 140 | 27 | Bascule. Notes 1 and 3. |
| | Chicago Sanitary and Ship Canal | | 6.28 | | | | | |
| | **South Fork of South Branch** | | | | | | | |
| 36 | Illinois Gulf Central RR bridge | Railroad | 5.78 | | | 92 | 17 | Fixed. |
| 37 | Adlai E. Stevenson Expressway bridge | Highway | 5.83 | | | 90 | 31 | Fixed. |
| 38 | Archer Ave. bridge | Highway | 5.86 | | | 90 | 17 | Fixed. |
| 39 | 35th St. bridge | Highway | 6.53 | | | 121 | 12 | Fixed. |

## Structures across Chicago River and its Branches (Continued)

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **North Branch** | | | | | | | |
| 40 | Chicago & North Western Ry. bridge | Railroad | 1.76 | | | 105 | 6 | Bascule. Note 7. |
| 41 | Kinzie St. bridge | Highway | 1.81 | | | 100 | 13 | Bascule. Note 1. |
| 42 | Grand Ave. bridge | Highway | 2.00 | | | 120 | 18 | Bascule. Notes 1 and 3. |
| 43 | Ohio St. bridge | Highway | 2.09 | | | 138 | 31 | Bascule. Note 1. |
| 44 | Erie St. bridge | Highway | 2.21 | | | 131 | | Bridge leaves removed. Abutments remain. |
| 45 | Chicago Ave. bridge | Highway | 2.40 | | | 148 | 18 | Bascule. Notes 1 and 2. |
| | Lower junction with North Branch Canal | | 2.52 | | | | | |
| 46 | North Halsted St. bridge | Highway | 2.65 | | | 140 | 22 | Bascule. Note 1. |
| 47 | Ogden Ave. bridge | Highway | 2.86 | | | 138 | 20 | Bascule. Notes 1 and 2. |
| 48 | Division St. bridge | Highway | 3.30 | | | 91 | 18 | Bascule. Notes 1 and 3. |
| | Turning Basin | | 3.73 | | | | | |
| 49 | North Ave. bridge | Highway | 3.81 | | | 125 | 18 | Fixed. |
| 50 | Chicago, Milwaukee, St. Paul & Pacific RR bridge | Railroad | 4.37 | | | 82 | 9 | Swing. Note 1. |
| 51 | Cortland St. bridge | Highway | 4.48 | | | 101 | 17 | Bascule. Note 4. |
| 52 | Webster Ave. bridge | Highway | 4.85 | | | 128 | 17 | Bascule. Note 4. |
| 53 | North Ashland Ave. bridge | Highway | 4.90 | | | 140 | 18 | Bascule. Note 4. |
| 54 | Chicago & North Western Ry. bridge | Railroad | 5.01 | | | 123 | 19 | Bascule. Note 4. |
| 55 | Fullerton Ave. bridge | Highway | 5.30 | | | 93 | 22 | Fixed. |
| 56 | North Damen Ave. bridge | Highway | 5.59 | | | 118 | 24 | Fixed |
| 57 | Diversey Parkway bridge | Highway | 5.99 | | | 95 | 22 | Fixed. |
| 58 | Western Ave. bridge | Highway | 6.39 | | | 95 | 18 | Fixed. |
| 59 | Belmont Ave. bridge | Highway | 6.76 | | | 75 | 18 | Bascule. Note 4. |
| 60 | Overhead cable | Power | 7.24 | | | | 48 | |
| 61 | Addison St. bridge | Highway | 7.30 | | | 73 | 18 | Fixed. |
| 62 | Overhead cable | | 7.41 | | | | | Data not available. |
| 63 | Irving Park Rd. bridge | Highway | 7.83 | | | 62 | 18 | Fixed. |
| 64 | Montrose Ave. bridge | Highway | 8.33 | | | 68 | 17 | Fixed. |
| 65 | Wilson Ave. bridge | Highway | 8.60 | | | 73 | 17 | Fixed. |
| 66 | Overhead cable | | 8.72 | | | | | Data not available. |
| 67 | Chicago Transit Authority bridge (Ravenswood) | Railroad | 8.73 | | | 40 | 19 | Fixed. |
| 68 | Lawrence Ave. bridge | Highway | 8.94 | | | 54 | 18 | Fixed. |
| 69 | Argyle St. bridge | Highway | 9.23 | | | 59 | 18 | Fixed. |
| 70 | Overhead pipeline | Water | 9.24 | | | | 18 | |
| | North Shore Channel | | 9.36 | | | | | |
| | **North Branch Canal** | | | | | | | |
| 71 | Overhead cable | Power | 2.80 | | | | 72 | |
| 72 | Overhead cable | Power | 2.81 | | | | 72 | |
| 73 | North Halsted St. bridge | Highway | 2.85 | | | 56 | 15 | Bascule. Note 1. |
| 74 | Ogden Ave. bridge | Highway | 2.89 | | | 132 | 30 | Bascule. Notes 1 and 3. |
| 75 | Division St. bridge | Highway | 2.99 | | | 74 | 18 | Bascule. Notes 1 and 3. |
| 75A | Overhead pipeline. | | 3.13 | | | 137 | 30 | |
| 76 | Chicago, Milwaukee, St. Paul & Pacific RR bridge | Railroad | 3.54 | | | 113 | 8 | Swing. Notes 5 and 6. |
| | Upper junction with North Branch | | 3.57 | | | | | |

Note 1.—See **33 CFR 117.1 through 117.59 and 117.391**, chapter 2, for drawbridge regulations.
Note 2.—Resident bridgetender assisted by roving tender. Advance notice is required for opening.
Note 3.—Operated by roving bridgetender. Advance notice is required for opening.
Note 4.—See **33 CFR 117.391 (k)**, chapter 2, for drawbridge regulations.
Note 5.—See **33 CFR 117.391 (f)**, chapter 2, for drawbridge regulations.
Note 6.—Vertical clearance is for center width of 93 feet.
Note 7.—Bridge kept in open position except for passage of a train.
Note 8.—The bridgetender can be contacted on VHF–FM channel 16, call "South Branch" or WHU–713; or by telephone, 312–930–4125.

## *Bridges across North Shore Channel
### *Miles above W end of Chicago Lock (41°53′18″N., 87°36′28″W.)
### **Clear width in feet proceeding toward Wilmette

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | Junction with North Branch Chicago River | | 9.36 | | | | | |
| 1 | Foster Ave. bridge | Highway | 9.49 | | | 59 | 18 | Fixed. |
| 2 | Bryn Mawr Ave. bridge | Highway | 10.00 | | | 62 | 18 | Fixed. |
| 3 | Peterson Ave. bridge | Highway | 10.53 | | | 60 | 18 | Fixed. |
| 4 | Lincoln Ave. bridge | Highway | 10.62 | | | 60 | 19 | Fixed. |
| 5 | Devon Ave. bridge | Highway | 11.01 | | | 67 | 18 | Fixed. |
| 6 | Touhy Ave. bridge | Highway | 12.02 | | | 67 | 19 | Fixed. |
| 7 | Howard St. bridge | Highway | 12.52 | | | 81 | 19 | Fixed. |
| 8 | Chicago Transit Authority bridge | Railroad | 12.77 | | | 101 | 33 | Fixed. |
| 9 | Chicago & North Western Ry. bridge | Railroad | 12.92 | | | 60 | 19 | Fixed. |
| 10 | Oakton St. bridge | Highway | 13.03 | | | 81 | 19 | Fixed. |
| 11 | Main St. bridge | Highway | 13.53 | | | 67 | 19 | Fixed. |
| 12 | Dempster St. bridge | Highway | 14.03 | | | 67 | 19 | Fixed. |
| 13 | Church St. bridge | Highway | 14.54 | | | 67 | 19 | Fixed. |
| 14 | Emerson St. bridge | Highway | 14.83 | | | 67 | 20 | Fixed. |
| 15 | Brown Ave. bridge | Highway | 15.29 | | | 67 | 20 | Fixed. |
| 16 | Green Bay Rd. bridge | Highway | 15.68 | | | 66 | 20 | Fixed. |
| 17 | Chicago & North Western Ry. bridge | Railroad | 15.69 | | | 59 | 26 | Fixed. |
| 18 | Lincoln St. bridge | Highway | 16.03 | | | 60 | 20 | Fixed. |
| 19 | Central St. bridge | Highway | 16.20 | | | 63 | 20 | Fixed. |
| 20 | Chicago Transit Authority bridge | Railroad | 16.31 | | | 45 | 35 | Fixed. |
| 21 | Isabella St. bridge | Highway | 16.52 | | | 67 | 20 | Fixed. |
| 22 | Maple Ave. bridge | Highway | 16.69 | | | 67 | 21 | Fixed. |
| 23 | Linden Ave. bridge | Highway | 16.86 | | | 61 | 20 | Fixed. |
| 24 | Sheridan Rd. bridge | Highway | 17.00 | | | 32 | 21 | Fixed. |
| | Wilmette Lock | | 17.00 | | | | | Inoperable. Closed to navigation. |

Several other small-craft basins along the Chicago lakefront are described under separate headings.

(592) **Communications.**–Chicago has excellent rail, highway, and air connections for passengers and freight.

(593) **Illinois Waterway.**–This waterway is a system of channels connecting Lake Michigan with the **Mississippi River** at Grafton, Ill. From the mouth of the Chicago River to the Mississippi River, the waterway is 327 miles long. The **Illinois River,** from its headwaters at the confluence of the **Des Plaines River** and **Kankakee River** to its mouth at the junction with the Mississippi River, constitutes about 273 miles of the waterway. The waterway may be entered through Chicago Harbor via the Chicago River and the Chicago River South Branch, or through Calumet Harbor via the Calumet River, the **Little Calumet River,** and the **Calumet Sag Channel.** These channels connect with the **Chicago Sanitary and Ship Canal** which leads SW to connect with the Des Plaines River at Lockport. The waterway follows the Des Plaines River to the head of the Illinois River and thence down the Illinois River to the junction with the Mississippi River at Grafton. The Mississippi River below Grafton is discussed in U.S. Coast Pilot 5.

(594) **Water Diversion from Lake Michigan.**–The State of Illinois is authorized by a United States Supreme Court decree to divert 3,200 cubic feet per second of water from Lake Michigan into the channels of the Illinois Waterway. As a result, the flow of water is normally away from the lake, except during excessive storm runoff or when lake levels are more than 2 feet below Low Water Datum.

(595) In addition to entering the waterway through the Chicago and Calumet Rivers, water from Lake Michigan also enters the waterway through the North Shore Channel at Wilmette Harbor. North Shore Channel then connects with the North Branch of the Chicago River. Vessels, however, may not enter the waterway at Wilmette as the lock there is inoperable.

(596) **Channels.**–The channels in the Illinois Waterway are maintained at the Federal project depth of 9 feet.

(597) The minimum horizontal clearance, normal to the channel is 80 feet at the butterfly dam in the Chicago Sanitary and Ship Canal.

(598) **U.S. Army Corps of Engineers (USACE) Emergency Numbers.**–The U.S. Army Corps of Engineers, Rock Island District, has emergency telephone numbers for reporting navigation channel groundings, closures, and other situations of importance

for both the Illinois Waterway and the Mississippi River: Illinois Waterway 319-328-2719; Mississippi River 319-328-2718.

(599) **Water levels.**–Water levels in the Chicago Sanitary and Ship Canal are governed by the controlling works located at the mouth of the Chicago River, in the Calumet River, at Wilmette Harbor, and at Lockport.

(600) **Currents.**–Currents in Calumet Sag Channel are 0.2 to 0.4 mph with a maximum of 1.3 mph during periods of heavy runoff.

(601) **Bridges.**–Minimum vertical clearances are 18 feet in the Little Calumet River and 24 feet in Calumet Sag Channel. (For bridge clearances in the Chicago River and the Chicago River South Branch, see the Chicago River bridge tables.) From the South Branch of the Chicago River, the minimum vertical clearance in the Sanitary and Ship Canal is 17 feet to Lemont, thence from Lemont to the junction with the Des Plaines River the minimum clearance is 44 feet. Due to this great change in vertical clearances in the Sanitary and Ship Canal, lake-bound barges change tugs at Lemont for smaller tugs which can navigate under the bridges between Lemont and Lake Michigan. The minimum vertical clearance in the Des Plaines River and the Illinois River is 46 feet above normal pool level (34 feet above extreme high water). (See the bridge tables following.)

(602) **Overhead cables.**–Numerous overhead cables cross all these channels, but do not obstruct any craft which can pass under the bridges.

(603) **Locks.**–The Illinois Waterway has nine U.S. Government locks including Chicago Lock at the mouth of the Chicago River. (See **33 CFR 207.300,** chapter 2, for lock regulations in the Illinois Waterway.)

(604) The **Thomas J. O'Brien Lock** is on the W side of the Calumet River about 0.7 mile above Turning Basin No. 5 in Calumet Harbor. A dam with controlling works extends from the lock wall E across the river and allows passage through the lock only. The lock is 1,000 feet long and 110 feet wide with a depth over the sills of 15 feet and a nominal lift of 2 feet. Passage through the lock is governed by flashing traffic signal lights on the W lock wall near the upper and lower lock gates. (See **33 CFR 207.300 and 207.425,** chapter 2, for lock regulations.) With favorable river conditions or when for any reason the lock is not being operated, the lock gates at both ends of the chamber will be fully opened. At such times, navigation through the lock remains under control of the lockmaster and the following regulations apply: for commercial craft, the **speed limit** through the chamber is 4 mph, passing in the lock chamber in either direction is prohibited, and stopping along or tying up to the lock or guide walls is prohibited; for recreational craft, speed through the chamber shall be commensurate with safety but not more than 4 mph, passing commercial craft in either direction is prohibited, and the lock is to be used for through navigation only.

(605) Lockport Lock, in the Chicago Sanitary and Ship Canal at the junction with the Des Plaines River, is 600 feet long and 110 feet wide with a nominal lift of 39.6 feet. An adjoining auxiliary lock is inoperable. Occasionally when heavy precipitation is predicted, the water level in the Sanitary and Ship Canal will be lowered to accommodate the expected water runoff in the canal. When the water in the canal falls below a level of 566.68 feet above mean water level at Father Point (Pointe au Pere), Que., International Great Lakes Datum (1955), or its equivalent, locking operations are suspended for lack of navigable depth over the upper lock sill. During periods of heavy discharge through the controlling works adjacent to the lock, currents in the channel below the lock may be strong enough to break mooring lines or stop the progress of low power vessels and large tows. Vessels moored in the vicinity or transiting the lock should monitor VHF-FM channel 16 for announcements of changes in discharge rates.

(606) The Lockport Controlling Works and a butterfly dam are about 2 miles N of Lockport Lock. The controlling works are on the W bank of the canal just N of the butterfly dam. The sluice gates of the controlling works are equipped with two oscillating red warning lights, one directed each way in the canal so as to be readily visible to mariners. The lights operate when the sluice gates are open and warn mariners to keep to the E side of the channel, clear of the sluice gates. The butterfly dam swings on pivots located in midstream. The dam is normally open and provides a horizontal clearance of 80 feet on either side. The dam is solely a safety device, providing a method of stopping the flow of water in the event of damage to the levee walls or to the Lockport Lock and powerplant complex downstream. Mariners are cautioned to watch out for this structure. Fluctuations in the water level of up to 10 feet may be expected immediately above the Lockport Lock, decreasing to 4 feet at the head of the canal.

(607) Brandon Road Lock, in the Des Plaines River about 4.8 miles below the Lockport Lock, is 600 feet long and 110 feet wide with a nominal lift of 34 feet. Immediately above the lock is a large basin well suited for turning and rearranging tows. The dam at Brandon Road has movable tainter and sluice gates which control the flow and make it possible to maintain a pool level, with small fluctuation above the dam, under normal conditions. Below the dam, an 8¾-foot fluctuation in water level may be expected.

(608) The remaining five locks are in the Illinois River at Dresden Island, Marseilles, Starved Rock, Peoria, and LaGrange. Each lock is 600 feet long and 110 feet wide.

(609) Dresden Island Lock, just below the confluence of the Des Plaines River and the Kankakee River, has a nominal lift of 21.75 feet. The pool above the lock is wide, while that below the lock is quite narrow for about 22 miles. High flows from rainfall runoff and spring thaws can cause the lower pool level to fluctuate drastically; fluctuations of 22 feet may be expected. When conditions of high flow exist, vessels must take into account overhead clearances, vessel draft, and available power. Bridge clearances are reduced so that many towboats cannot pass under the railroad bridge just below the lock. Shallow-draft vessels risk grounding on the lower guide wall which may be submerged. Fully laden barges, drawing 8 to 9 feet, under most circumstances may safely transit the lock by maintaining contact with the lower guide wall even when it is submerged. The outdraft from the dam can pull low or underpowered craft into the dam from the upper pool near the lock. In the lower pool, low or underpowered craft may be driven into the bank or the railroad bridge. When open and lighted, the outdraft sign must be heeded.

(610) Marseilles Lock, 27 miles below Dresden Island Lock, has a nominal lift of 24.25 feet. Spring thaws and rain runoff cause a maximum fluctuation of level of the lower pool of 9 feet. Once a year during this high level condition the lower guide wall is submerged, and shallow-draft vessels risk grounding. During conditions of high flow from the dam, vessels should exercise extreme caution when entering or exiting Marseilles Canal. A hazardous outdraft condition is indicated by an open and lighted outdraft warning sign at the head of the canal.

(611) Starved Rock Lock, 13 miles below Marseilles Lock, has a nominal lift of 18.7 feet. Variation in the lift can be as much as 17 feet depending on flow. Severe outdraft during moderate to high flow conditions makes downbound entry or upbound exiting of the lock difficult to dangerous. When the lower pool reaches a level of 450 feet above MSL 1929, shallow-draft vessels risk grounding on the lower guide wall or the bullnose on the lower left lock wall.

## Structures across Calumet Sag Channel
### *Miles above Calumet Harbor Pierhead Light
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Low | High | |
| | Junction with Little Calumet River | | 13.48 | | | | | | |
| 1 | Ashland Ave. bridge | Highway | 13.98 | | | 223 | 26 | | Fixed. |
| 2 | Overhead cable | Power | 14.02 | | | | 68 | | |
| 3 | Dan Ryan Expressway (I—57) bridge | Highway | 14.04 | | | 225 | 41 | | Fixed. |
| 4 | Overhead cable | Power | 14.47 | | | | 43 | | |
| 5 | Division St. bridge | Highway | 14.49 | | | 225 | 24 | | Fixed. |
| 6 | Chatham St. bridge | Highway | 14.77 | | | 225 | 24 | | Fixed. |
| 7 | Western Ave. bridge | Highway | 15.01 | | | 225 | 44 | | Fixed. |
| 8 | Chicago, Rock Island & Pacific RR bridge | Railroad | 15.05 | | | 225 | 24 | | Fixed. |
| 9 | Baltimore & Ohio Chicago Terminal RR bridge | Railroad | 15.37 | | | 225 | 24 | | Fixed. |
| 10 | Grand Trunk Western RR bridge | Railroad | 15.38 | | | 225 | 24 | | Fixed. |
| 11 | Grand Trunk Western RR bridge | Railroad | 15.39 | | | 225 | 24 | | Fixed. |
| 12 | Baltimore & Ohio Chicago Terminal RR bridge | Railroad | 15.41 | | | 225 | 24 | | Fixed. |
| 13 | Grand Trunk Western RR and Chicago, Rock Island & Pacific RR bridge | Railroad | 15.42 | | | 225 | 24 | | Fixed. |
| 14 | Francisco Ave. bridge | Highway | 15.63 | | | 225 | 24 | | Fixed. |
| 15 | Overhead cable | Power | 15.64 | | | | 36 | | |
| 16 | Overhead cable | Power | 15.82 | | | | 60 | | |
| 17 | Kedzie Ave. bridge | Highway | 16.01 | | | 225 | 24 | | Fixed. |
| 18 | Overhead pipeline | | 16.04 | | | | 30 | | |
| 19 | Overhead pipeline | | 16.22 | | | | 31 | | |
| 20 | Overhead cable | Power | 16.25 | | | | 54 | | |
| 21 | Overhead cable | Power | 16.27 | | | | 54 | | |
| 22 | Overhead pipeline | | 16.37 | | | | 27 | | |
| 23 | Overhead cables | Power | 16.81 | | | | 60 | | |
| 24 | Crawford Ave. bridge | Highway | 17.01 | | | 198 | 26 | | Fixed. |
| 25 | Northern Illinois Toll Highway bridge | Highway | 17.35 | | | 225 | 39 | | Twin fixed. |
| 26 | Overhead cable | Power | 17.48 | | | | 59 | | |
| 27 | Overhead cable | Power | 17.50 | | | | 58 | | |
| 28 | Cicero Ave. bridge | Highway | 18.08 | | | 198 | 24 | | Fixed. |
| 29 | 127th St. bridge | Highway | 18.81 | | | 225 | 24 | | Fixed. |
| 30 | Ridgeland Ave. bridge | Highway | 20.47 | | | 225 | 24 | | Fixed. |
| 31 | Overhead cable | Power | 21.44 | | | | 67 | | |
| 32 | Overhead cable | Power | 21.45 | | | | 44 | | |
| 33 | Overhead cable | Telephone | 21.47 | | | | 35 | | |
| 34 | Harlem Ave. bridge | Highway | 21.48 | | | 225 | 24 | | Fixed. |
| 35 | Norfolk Southern RR bridge | Railroad | 22.13 | | | 225 | 43 | | Fixed. |
| 36 | Overhead cable | Telegraph | 22.16 | | | | 37 | | |
| 37 | Southwest Highway bridge | Highway | 22.25 | | | 188 | 26 | | Fixed. |
| 38 | Overhead cable | Power | 22.27 | | | | 62 | | |
| 39 | Overhead cable | Power | 22.33 | | | | 72 | | |
| 40 | Overhead cable | Power | 22.37 | | | | 72 | | |
| 41 | 96th Ave. bridge | Highway | 24.56 | | | 225 | 24 | | Fixed. |
| 42 | 104th Ave. bridge | Highway | 25.56 | | | 225 | 24 | | Fixed. |
| 43 | Overhead cable | Telephone | 28.58 | | | | 39 | | |
| 44 | Overhead cable | Power | 28.60 | | | | 68 | | |
| 45 | Sag Highway bridge | Highway | 28.76 | | | 225 | 39 | | Fixed. |
| 46 | Overhead cable | Power | 28.90 | | | | 100 | | |
| 47 | Illinois Gulf Central RR bridge | Railroad | 29.01 | | | 225 | 24 | | Fixed. |
| 48 | Overhead cable | Power | 29.19 | | | | 62 | | |
| | Junction with Chicago Sanitary and Ship Canal | | 29.44 | | | | | | |

## Structures across Chicago Sanitary and Ship Canal
### *Miles above W end of Chicago Lock (41°53′18″N., 87°36′28″W.)
### **Clear width in feet proceeding away from the lake

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Low | High | |
| 1 | South Western Ave. bridge | Highway | 6.7 | | | 155 | 22 | | Vertical lift. Note 1. |
| 2 | Baltimore & Ohio Chicago Terminal RR bridge | Railroad | 6.9 | | | 120 | 17 | | Bascule. Note 1. |
| 3 | South California Ave. bridge | Highway | 7.3 | | | 128 | 17 | | Bascule. Note 1. |
| 4 | Illinois Central Gulf RR bridge | Railroad | 7.7 | | 85 | | 19 | | Swing. Note 1. |
| 5 | South Kedzie Ave. bridge | Highway | 7.8 | | | 130 | 22 | | Fixed. |
| 6 | Grand Trunk Western Ry. bridge | Railroad | 8.4 | 45 | 80 | | 18 | | Swing. Note 1. |
| 7 | South Pulaski Rd. bridge | Highway | 8.9 | | | 140 | 22 | | Bascule. Note 1. Construction for replacement fixed bridge. Oct. 94. |
| 8 | Belt RR bridge | Railroad | 9.7 | | 97 | | 17 | | Swing. Note 1. |
| 9 | South Cicero Ave. bridge | Highway | 10.0 | | | 140 | 18 | | Bascule. Note 1. |
| 10 | South Central Ave. bridge | Highway | 11.1 | | | 170 | 42 | | Fixed. |
| 11 | Atchison, Topeka & Sante Fe Ry. bridge | Railroad | 12.5 | 130 | 85 | | 18 | | Swing. Note 1. |
| 12 | South Harlem Ave. bridge | Highway | 13.3 | | | 140 | 23 | | Bascule. Note 1. |
| 13 | Adlai E. Stevenson Expressway bridge | Highway | 13.9 | | | 160 | 41 | | Twin fixed. |
| 14 | Lawndale Ave. bridge | Highway | 14.3 | | | 160 | 39 | | Twin fixed. |
| 15 | Baltimore & Ohio Chicago Terminal RR bridge | Railroad | 15.1 | | 90 | 113 | 18 | | Swing. Note 1. |
| 16 | La Grange Road (Justice) bridge | Highway | 17.9 | | | 260 | 40 | | Twin fixed. |
| 17 | Northern Illinois Toll Highway bridges | Highway | 18.1 | | | 242 | 39 | | Twin fixed. |
| 19 | Willow Springs Rd. bridge | Highway | 19.4 | | | 165 | 39 | | Bascule. |
| 20 | Sag Highway bridge | Highway | 23.2 | | | 160 | 39 | | Fixed. |
| | Calumet Sag Channel | | 23.8 | | | | | | |
| 21 | Overhead pipeline | | 24.0 | | | | 55 | | |
| 22 | Illinois Central Gulf RR bridge, Lemont | Railroad | 26.7 | | | 160 | 19 | | Swing. Note 1. |
| 23 | Lemont High-Rise Bridge | Highway | 26.7 | | | 227 | 47 | | Fixed. |
| 24 | Overhead pipeline | | 30.7 | | | | 44 | | |
| 25 | Romeo Rd. bridge | Highway | 31.1 | | | 160 | 17 | | Swing. Note 2. |
| 26 | Overhead pipeline | | 31.9 | | | | 46 | | |
| 27 | Butterfly dam | | 34.2 | 80 | 80 | | | | |
| 28 | 9th St. bridge, Lockport | Highway | 34.6 | | | 225 | 47 | | Fixed. |
| 29 | 16th St. bridge, Lockport | Highway | 35.2 | | 160 | | 4 | | Swing. |
| | Lockport Lock | | 36.2 | | | | | | |
| 30 | Lockport Lock bridge | Foot | 36.2 | | | 110 | 51 | | Fixed. |
| | Junction with Des Plaines River | | 37.1 | | | | | | Note 3. |

Note 1.—This bridge will not be opened for navigation.
Note 2.—Bridge is operated by aroving bridgetender who can be reachedat the Ruby St. bridge in Joliet, telephone, 815—722—3120.
Note 3.—See the table of bridges across Des Plaines River.

## Bridges across Des Plaines River
### *Miles above W end of Chicago Lock (41°53′18″N., 87°36′28″W.)
### **Clear width in feet proceeding away from Lake Michigan

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Pool level | High water | |
| | W end of Chicago Sanitary and Ship Canal | | 37.1 | | | | | | |
| 1 | Lockport-Elgin, Joliet & Eastern Ry. bridge | Railroad | 37.2 | | | 225 | 24 | 20 | Vertical lift. WHX-746. Notes 1 and 9. |
| 2 | Joliet-Ruby St. (SR 53) bridge | Highway | 38.5 | 200 | | | 16 | 13 | Bascule. WZQ-8761. Notes 2, 3, 5, and 9. |
| 3 | Joliet-Jackson St. bridge | Highway | 38.8 | | | 150 | 16 | 13 | Bascule. Notes 4 and 5. |
| 4 | Joliet-Cass St. (US 30) bridge | Highway | 39.1 | | | 150 | 16 | 13 | Bascule. Notes 4 and 5. |
| 5 | Joliet-Jefferson St. bridge | Highway | 39.4 | | | 150 | 16 | 13 | Bascule. Notes 4 and 5. |
| 6 | Joliet-Chicago Rock Island & Pacific RR bridge | Railroad | 39.6 | | | 150 | 9 | 6 | Vertical lift. KUF-907. Notes 6, 8, and 10. |
| 7 | Joliet-McDonough St. (US 6, US 52) bridge | Highway | 39.8 | | | 150 | 16 | 14 | Bascule. WZQ-8761. Notes 2, 4, 5, and 9. |
| 8 | I—80 bridges | Highway | 40.3 | | | 300 | 46 | 43 | Twin fixed. |
| | Brandon Road Lock and junction with Illinois and Michigan Canal | | 41.2 | | | | | | |
| 9 | Rockdale-Brandon Rd. bridge | Highway | 41.4 | | | 110 | | 8 | Bascule. WZQ-8761. Notes 8 and 9. |
| 10 | Overhead conveyor | | 42.3 | | | 480 | | 48 | Suspension. |
| 11 | Channahon—I—55 bridges | Highway | 49.3 | | | 420 | 47 | 41 | Twin fixed. |
| | Junction with Kankakee River, Head of Illinois River | | 54.3 | | | | | | Note 7. |

Note 1.—Bridge kept in the open position except for the passage of a train.

Note 2.—Bridge clearance gages have been installed at Joliet near the upstream end of the retaining wall above Ruby Street for the guidance of downbound vessels and on the left bridge pier downstream of McDonough Street for the guidance of upbound vessels. The gages are set to show the actual clearance between the water surface and the low steel of the bridges for the center 80-foot width of span. A sign over the gages reads, "Closed Vertical Clearance for Center 80 Feet of Span Joliet City Bridges." Masters of all vessels that can safely pass under the bridges in closed position are requested to do so and refrain from opening the bridges whenever possible.

Note 3.—Clear heights are for 105-foot width.

Note 4.—Clear heights are for 80-foot width.

Note 5.—See **33 CFR 117.1 through 117.59 and 117.395,** chapter 2, for drawbridge regulations.

Note 6.—Span raises 41.5 feet above heights shown. Several collisions have occurred at this bridge, and vessel masters are urged to reduce speed and exercise caution when passing the bridge.

Note 7.—For continuation, see the table of bridges across the Illinois River.

Note 8.—See **33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.

Note 9.—The bridgetender monitors VHF-FM channel 16 and works on channel 13.

Note 10.—The bridgetender monitors VHF-FM channel 16 and works on channel 14.

## Bridges across the Illinois River

***Miles from W end of Chicago Lock (41°53′18″N., 87°36′28″W.)***

****Clear width in feet proceeding away from Lake Michigan***

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Pool level | High water | |
| | Head of Illinois River at junction of Des Plaines and Kankakee Rivers | | 54.3 | | | | | | |
| | Dresden Island Lock | | 55.7 | | | | | | |
| 1 | Divine-Elgin, Joliet & Eastern Ry. bridge | Railroad | 56.6 | | | 113 | 26 | 8 | Vertical lift. Span raises 30.3 feet above heights shown. Notes 1 and 5. |
| 2 | Morris-State Route 47 bridge | Highway | 63.8 | | | 350 | 50 | 34 | Fixed. |
| 3 | Seneca-Chessie System RR bridge | Railroad | 73.1 | | | 140 | 21 | 9 | Vertical lift. Span raises 26.2 feet above heights shown. Notes 1 and 5. |
| 4 | Seneca-State Route 170 bridge | Highway | 74.5 | | | 354 | 47 | 37 | Fixed. |
| | Marseilles Canal | | 80.2 | | | | | | |
| 5 | Marseilles bridge | Highway | 80.3 | | | 225 | 46 | 46 | Fixed. |
| | Marseilles Lock | | 82.6 | | | | | | |
| 6 | Ottawa-State Route 23, Veterans Memorial Bridge | Highway | 87.5 | | | 476 | 47 | 38 | Fixed. Note 9. |
| 7 | Ottawa-Burlington Northern bridge | Railroad | 87.8 | | | 167 | 21 | 12 | Vertical lift. Span raises 26.4 feet above heights shown. WRD–810. Notes 5 and 8. |
| | Starved Rock Lock | | 96.2 | | | | | | |
| 8 | Utica-State Route 178 bridge | Highway | 97.6 | | | 356 | 63 | 44 | Fixed. |
| 8A | LaSalle-Route 412 bridge | Highway | 101.5 | | | 582 | 66 | 44 | Fixed. Under construction in October 1983. |
| 9 | LaSalle-Illinois Central RR bridge | Railroad | 101.7 | | | 260 | 61 | 43 | Fixed. |
| 11 | LaSalle (State Route 351) bridge | Highway | 102.5 | | | 249 | 26 | 8 | Vertical lift. Span raises 55.2 feet above heights shown. WZQ–8761. Notes 5, 7, and 8. |
| 12 | Peru-U.S. Route 51 bridge | Highway | 104.3 | | | 400 | 62 | 44 | Fixed. |
| 13 | Spring Valley-State Route 89 bridge | Highway | 108.7 | | | 350 | 60 | 43 | Fixed. |
| | Illinois and Mississippi Canal | | 117.0 | | | | | | |
| 15 | Hennepin-I—180 bridge | Highway | 119.4 | | | 350 | 59 | 42 | Fixed. |
| 16 | Hennepin-State Route 26 bridge | Highway | 119.6 | | | 350 | 59 | 42 | Fixed. |
| 17 | Henry-State Route 18 bridge | Highway | 131.2 | | | 350 | 59 | 42 | Fixed. |
| 18 | Lacon-State Route 17 bridge | Highway | 138.0 | | | 350 | 59 | 41 | Fixed. |
| 19 | Chillicothe-Atchison, Topeka & Sante Fe Ry. bridge | Railroad | 145.3 | | | 360 | 58 | 41 | Fixed. |
| 20 | Peoria-McCluggage Highway bridge | Highway | 161.4 | | | 411 | 65 | 58 | Dual fixed. |
| 21 | Peoria-Murray-Baker (I—74) bridge | Highway | 164.5 | | | 500 | 65 | 48 | Fixed. |
| 22 | Peoria-Franklin St. bridge | Highway | 164.9 | | | 121 | 31 | 15 | Bascule. WZQ–8761. Notes 1, 5, 7, and 8. |
| 23 | Peoria-Atchison, Topeka and Santa Fe RR bridge | Railroad | 165.0 | | 118 | | 13 | 3 | Swing. Note 2. |
| 24 | Peoria-Cedar St.-State routes 8, 29, 116 | Highway | 165.6 | | | 280 | 78 | 62 | Fixed arch. Clear heights are for 210-foot width. |
| 25 | Peoria-Peoria & Pekin Union Ry. bridge | Railroad | 166.5 | | | 307 | 19 | 2 | Vertical lift. WQX–651. Notes 1, 5, 6, and 8. |
| 26 | Shade Lohmann I—474 bridge | Highway | 169.2 | | | 500 | 64 | 48 | Fixed. |
| | Peoria Lock | | 169.5 | | | | | | |
| 27 | Pekin-bridge-State route 9 | Highway | 174.3 | | | 430 | 72 | 56 | Fixed. |
| 28 | Pekin-Chicago & North Western Ry. bridge | Railroad | 176.0 | | | 153 | 30 | 9 | Vertical lift. Span raises 41.7 feet above heights shown. KVF–831. Notes 5 and 8. |

## Bridges across the Illinois River (Continued)

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Pool level | High water | |
| 29 | Havana-U.S. Route 136, State routes 78, 97, bridge | Highway | 207.6 | | | 350 | 67 | 47 | Fixed. |
| 30 | Beardstown-Burlington Northern bridge | Railroad | 238.4 | | | 300 | 54 | 34 | Vertical lift. KLU–801. Notes 4 and 8. |
| 31 | Beardstown-U.S. Route 67, State route 100 bridge | Highway | 239.3 | | | 526 | 69 | 49 | Fixed. |
| | LaGrange Lock | | 247.0 | | | | | | |
| 32 | Meredosia-State Route 104 bridge | Highway | 255.9 | | | 554 | 72 | 47 | Fixed. |
| 33 | Valley City-Norfolk Southern RR bridge | Railroad | 265.9 | | | 300 | 32 | 6 | Vertical lift. Span raises 45.5 feet above heights shown. KTR–857. Notes 6 and 8. |
| 34 | Valley City | Highway | 266.9 | | | 535 | 71 | 55 | Fixed. Under construction. |
| 35 | Valley City | Highway | 267.1 | | | 540 | 71 | 55 | Fixed. Under construction. |
| 36 | Florence-U.S. Route 36, State route 100 bridge | Highway | 271.2 | | | 202 | 26 | 4 | Vertical lift. Span raises 56.8 feet above heights shown. WZQ–8761. Notes 1, 5, and 8. |
| 37 | Pearl-Illinois Central Gulf RR bridge | Railroad | 284.0 | | | 315 | 20 | 0 | Vertical lift. Span raises 69.5 feet above heights shown. KLU–797. Notes 5 and 8. |
| 38 | Hardin-State Route 100 bridge | Highway | 305.7 | | | 300 | 25 | 8 | Vertical lift. Span raises 56.9 above heights shown. WZQ–8761. Notes 1, 5, and 8. |
| | Junction with Mississippi River | | 327.2 | | | | | | |

Note 1.—Bridge signals are as follows: alternately flashing upper and lower vertically arranged green lights indicate draw is to open immediately, and alternately flashing right and left horizontally arranged red lights indicate draw cannot be opened immediately or must be closed immediately.

Note 2.—Swing span has been removed.

Note 3.—Bridge is kept in the open position except for the passage of a train.

Note 4.—See **33 CFR 117.1 through 117.59 and 117.393,** chapter 2, for drawbridge regulations. Bridge normally open, remotely controlled. Contact KLU–801 on VHF–FM channel 16, before transiting to ensure bridge remains open during passage.

Note 5.—See **33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.

Note 6.—Span raises about 47 feet above heights shown.

Note 7.—The bridgetender monitors VHF–FM channel 16 and works on channel 13.

Note 8.—The bridgetender monitors VHF–FM channel 16 and works on channel 14.

Note 9.—Clear heights are for 417-foot width.

Tows should exit the lock at a low rate of speed to prevent backlash.

(612) Peoria Lock, 73 miles below Starved Rock Lock, and LaGrange Lock, 77 miles below Peoria Lock, have nominal lifts of 11 and 10 feet, respectively. These locks were designed to accommodate flooding and have Chanoine Wicket dams for pool level control. The dams are lowered to the river bottom when the lower pool levels rise and approach the upper pool levels. When the dams are lowered to the river bottom, about 40 percent of the time, they are said to be in the "open pass" or "navigable pass" status. Tows should exit these locks at a low rate of speed to prevent backlash.

(613) Special restrictions are in effect concerning all locks and dams of the Illinois Waterway and the Chicago Lock at the mouth of the Chicago River. The restrictions are as follows: Boat crews, repairmen, and company officials will be permitted to embark or disembark at the above locations only after identification has been established satisfactorily to the lockmaster. Such identification can be established by the vessel master or pilot on duty personally signing a Necessity for Admission form which will be furnished by the lockmaster. The privilege of entering the lock premises is for the express purpose only of embarking or disembarking from a vessel, and shall not be construed as permission to use the reservation for waiting or any other purpose. Supplies, packages, and parcels, including laundry, will not be accepted by the lockmaster for delivery to or from vessels.

(614) **Navigation Charts.**–Charts of the Illinois Waterway is a booklet of charts showing this maintained waterway from the Mississippi River at Grafton, Ill., to Lake Michigan at Chicago, Ill. The booklet is published and sold by the U.S. Army Corps of Engineers, Rock Island District. (See appendix for address.)

(615) **Light List.**–Aids to navigation of the Illinois Waterway are contained in Light List, Volume VII, Great Lakes, and Light List, Volume V, Mississippi River System, for above and below the Lockport Lock, respectively. The Light List is available from the U.S. Government Printing Office. (See appendix for address.)

(616) From Chicago Harbor N for 13.5 miles to Wilmette, the shore is bordered by shoals and detached spots that extend 4 miles off. Carter H. Harrison Crib, 2.1 miles NNE of Chicago Harbor Light, is connected to William E. Dever Crib, close NE, by a bridge with a clearance of about 27 feet. William E. Dever Crib is marked by a private light with a fog signal.

(617) A submerged bulkhead, covered 2 feet, parallels the shoreline about 450 feet off, from 1.9 to 2.8 miles N of the Chicago River entrance. The bulkhead is marked at intervals by 5-foot-high piles. Small craft should not attempt to cross the bulkhead. At the S end of the bulkhead, a private light marks North Avenue Jetty.

(618) **Diversey Harbor** is a small-craft basin protected by breakwaters about 3 miles N of Chicago River entrance. The ends of the N and S breakwaters are seasonally marked by private lights. The controlling depths are about 9 feet in the entrance channel with 8 feet in the basin and shoaling toward shore. Mariners should use caution when using the harbor during high waves and swells. The entrance channel is crossed by a fixed highway bridge with a clearance of 14 feet. Vessel traffic control lights on the bridge are directed either direction in the channel and operate as follows: green, 10 minutes; red, 10 minutes. These lights operate 24 hours during good weather.

(619) **Belmont Harbor** is a small-craft basin 4 miles N of Chicago River entrance. The entrance to the basin is marked on the N side by private lights. The entrance channel has a controlling depth of about 17 feet, and the basin has central depths of 17 to 24 feet with shoaling toward shore. Gasoline, diesel fuel, ice, and sewage pump-out facilities are available in the basin.

(620) An 8-foot shoal, marked on the E side by a buoy, is 0.3 mile NE of the entrance to Belmont Harbor. An 11-foot shoal is 0.8 mile NE of the entrance.

(621) **Charts 14905, 14927, 14926.**–The shore from Belmont Harbor N for 1.3 miles to Montrose Harbor is paralleled 16 feet off by a submerged shore-protection bulkhead, covered about 4½ feet. The bulkhead is marked at 20-foot intervals by 5½-foot-high piles. Small-craft should not attempt to cross the bulkhead.

(622) **Montrose Harbor** is a small-craft basin about 5 miles N of Chicago Harbor. The entrance to the basin, from S, is protected by two breakwaters, each marked on the outer end by a private light. The entrance channel has depths of about 18 feet with 17 feet in the basin. Sewage pump-out facilities are available in the basin.

(623) A breakwater, marked at the inner and outer ends by private lights, extends N from the point of land which forms the N and E sides of Montrose Harbor.

(624) Wilson Avenue Crib, marked by a private light with a fog signal, is 2.6 miles E of Montrose Harbor entrance. An automatic wave recorder, covered 6½ feet, is about 400 feet NW of the crib.

(625) A shoal with rock outcroppings covered 15 to 18 feet extends 3.5 miles offshore from about 1 to 4 miles N of Montrose Harbor.

(626) **Grossepoint Light** (42°04.0′N., 87°41.0′W.), 119 feet above the water, is a prominent private aid shown from a white conical tower with a red roof close to shore 7.3 miles N of Montrose Harbor and 1 mile S of Wilmette. An automatic wave recorder, 13 feet high, is close offshore 0.25 mile SE of the light.

(627) **Wilmette, Ill.,** is a small-craft harbor at the N terminous of North Shore Channel, about 13.5 miles N of Chicago Harbor. The harbor is used primarily by pleasure craft. The white dome of the Baha'i Temple 0.3 mile SW of the harbor entrance is prominent.

(628) **Channels.**–The harbor is entered NW from deep water in Lake Michigan between two piers to an inner harbor basin. A breakwater extending E from the shore N of the entrance piers provides some protection from N winds. The outer ends of the piers and the breakwater are marked by private lights. In July 1978, the entrance channel was reportedly being maintained to a depth of 8 feet during the boating season. In 1971, the controlling depth in the basin was about 3 feet. In October 1987, shoaling to an unknown depth was reported at the entrance to the harbor, extending about 50 yards S from the Wilmette Harbor Entrance North Light.

(629) **Caution.**–When approaching the harbor during periods of reduced visibility, mariners are cautioned against mistaking the breakwater for the N pier. Vessels approaching from the N are advised to pass well clear of the N pier before hauling around to the entrance.

(630) **Sluice Gate.**–To regulate the flow of water from Lake Michigan into North Shore Channel, a sluice gate has been constructed at the SW end of the harbor basin by the Chicago Sanitary District. A navigation lock in the structure is inoperable and blocks access from the harbor to the channel. Since there may be considerable current through the harbor when the gate is open, an oscillating red warning light is operated near the gate.

(631) **Wilmette Coast Guard Station** is on the N side of the harbor basin.

(632) **Small-craft facilities.**–Limited transient berths, gasoline, sewage pump-out facilities, and limited supplies are available in the harbor. A hoist can handle 30-foot craft for minor repairs.

(633) **Chart 14905.**–From Wilmette, the shore extends 21 miles NNW to Waukegan. This reach is low for the first 5 miles, thence has 70-foot bluffs N to Waukegan. In the vicinity of Wilmette, shoals extend 2.3 miles offshore, but over the rest of the reach, the shoal border is less than 2 miles wide. A wreck, covered 15 feet and marked by a lighted bell buoy, is 2 miles NE of Wilmette. A rocky spot, covered 22 feet and marked on the E side by a lighted bell buoy, is about 6 miles NE of Wilmette. **Glencoe Shoal,** covered 8 feet, is 1 mile offshore 5.5 miles NNW of Wilmette. A detached 21-foot spot is 3.3 miles offshore about 3 miles N of Glencoe Shoal. In 1958, a wreck was reported 3.4 miles offshore 5.3 miles N of Glencoe Shoal.

(634) **Great Lakes Naval Training Center Harbor,** about 3.5 miles S of Waukegan, is a protected area of about 100 acres enclosed by breakwaters on the N, E, and S. The harbor is used by training vessels and by pleasure craft of personnel stationed at the base. Permission to enter the harbor must be obtained from the **harbormaster,** who may be contacted on VHF-FM channel 16, call Great Lakes Harbor, or at the boathouse, Building 13, in the inner basin. The harbor is available as a refuge during storm or other emergency.

(635) The N breakwater extends E from the shore and joins the E breakwater, which then extends S to the entrance channel. The S breakwater extends E from shore to the entrance channel. The outer ends of the breakwaters are marked by lights. In 1977, the entrance channel had a centerline controlling depth of 12 feet. A channel through the outer harbor has a depth of about 13 feet. From the outer harbor a channel leads between piers to an inner basin. The outer ends of the piers are marked by lights. The channel to the inner basin has a depth of about 14 feet.

(636) A **restricted area** extends 1 mile into Lake Michigan, from Great Lakes Naval Training Center Harbor S breakwater N for 1.6 miles. A **danger zone** for rifle firing practice extends 2

miles into the lake just N of the harbor. (See **33 CFR 334.820 and 334.830,** chapter 2, for limits and regulations.)

(637) **Charts 14904, 14905.–Waukegan, Ill.,** is a city and small commercial harbor on the W side of Lake Michigan 35 miles N of Chicago Harbor. The principal cargoes handled in the port are bulk cement and gypsum rock. Prominent are stacks at the Commonwealth Edison Co. 1.5 miles N of the harbor and the light on the intake crib 2.1 miles N of the harbor.

(638) **Waukegan Harbor Light** (42°21.6′N., 87°48.8′W.), 36 feet above the water, is shown from a white cylindrical tower with an attached building on the outer end of the S pier; a fog signal is at the light. The light is sometimes difficult to distinguish from shore lights in the background.

(639) **Channels.**–The harbor is entered through a dredged entrance channel leading W from deep water in Lake Michigan between parallel piers to an inner harbor basin. A breakwater extending from shore on the N side of the entrance channel protects the entrance from NE seas. The outer ends of the piers and breakwater are marked by lights. In May-June 1982, the controlling depths were 19 feet in the S half of the entrance channel, thence 15 feet at midchannel in the channel between the piers; thence 14 feet in the basin except for shoaling along the edges. The entrance channel is subject to shoaling caused by the drift of sand from the N. Above the dredged area, the inner basin has depths of 14 to 20 feet with shoaling to 8 feet and less at the N end.

(640) The inner basin is not adapted for anchorage, but vessels may moor to the revetment on the W side or in the slips N of the basin. During severe storms, vessels are sometimes required to moor in the middle of the slips and away from the docks to prevent damage to the vessels and revetments. Mariners are cautioned against navigating outside the channel limits in the vicinity of structures protected by stone riprap.

(641) **Dangers.**–A foul area with a number of detached rock ledges is E of the harbor entrance. The area is marked by a buoy on the E side and a lighted buoy on the N side. Mariners should keep to N of the lighted buoy.

(642) **Caution.**–Sudden wind direction or barometric pressure changes may cause water levels in the harbor to rise or fall as much as 3 feet in a short time.

(643) **Harbor regulations.**–Federal regulations specify a **speed limit** of 4 mph (3.5 knots) in the harbor. (See **33 CFR 162.120**, chapter 2, for regulations.)

(644) Local harbor regulations have been established by the Waukegan Port District and are enforced by the Executive Director, Port of Waukegan, whose office is at South Harbor Marina. Copies of the regulations can be obtained from the Executive Director, Port of Waukegan, 55 South Harbor Place, P.O. Box 620, Waukegan, Ill. 60079. A **speed limit** of 5 mph (4.3 knots) is enforced in the inner and outer harbor of Waukegan.

(645) **Towage.**–Tugs are available in Waukegan atKadinger Marine Services, Inc.

(646) **Wharves.**–Waukegan has two deep-draft facilities in the slip on the NW side of the inner basin. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

(647) **La Farge Cement Dock:** S side of the slip; 620-foot face; about 16 to 17 feet alongside; deck height, 7 feet; covered storage for 32,000 tons of bulk cement; receipt of bulk cement; owned by Waukegan Port Authority and operated by La Farge Cement Co.

(648) **Gold Bond Building Products Dock:** N side of the slip; about 750 feet of berthing space; 15 to 16 feet alongside; deck height, 4 to 5 feet; open storage for 120,000 tons of gypsum rock; owned by Elgin, Joliet, and Eastern Railway and operated by Gold Bond Building Products, Division of National Gypsum Co.

(649) **Small-craft facilities.**–Marinas in the SW corner and at the N end of the inner basin provide transient berths, gasoline, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Hoists to 25 tons are available for hull and engine repairs.

(650) South Harbor Marina, owned and operated by the port district, is just S of the S pier of the entrance channel to the main harbor. The marina is entered from the S between protecting breakwaters. Over 750 berths are avaialable, with electricity, water, gasoline, diesel fuel and sewage pump-out.

(651) **Chart 14904.**–The shore from Waukegan N for 16 miles to Kenosha is low with some woods behind the beach. Shoals extend no more than 0.8 mile offshore. Small craft should avoid the submerged rock off the mouth of Barnes Creek, about 3.5 miles N of Winthrop Harbor.

(652) About 1.5 miles N of Waukegan, a breakwater extends 1,200 feet from shore to protect the intake channel of the Waukegan Generating Station, Public Service Co. The outer end of the breakwater is marked by a private light. A fish net is placed annually, between April and August, from the outer end of the breakwater to the shore about 1,200 feet SW. The net shows above the water and is marked by private buoys and floats. Three lighted stacks at the generating station are prominent from offshore.

(653) The towers of the Commonwealth Edison Co. nuclear powerplant at **Zion**, 6 miles N of Waukegan, are reported to be prominent from offshore.

(654) A large marina (42°29′05″N., 87°48′05″W.), along the Illinois shore is close E of the town of **Winthrop Harbor**, about 2 miles N of Zion.

(655) The marina basins are protected on the N and E sides by breakwaters. The S breakwater is marked by three lights. The N breakwater is marked by two lights. Both breakwaters have a light marking the entrance between the outer ends.

(656) Both the smaller N basin and the large S basin had a reported controlling depth of 9½ feet in 1993. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, launching ramps, haul-out to 70 tons, and full service marine repairs are available. The **harbormaster** monitors VHF-FM channel 16.

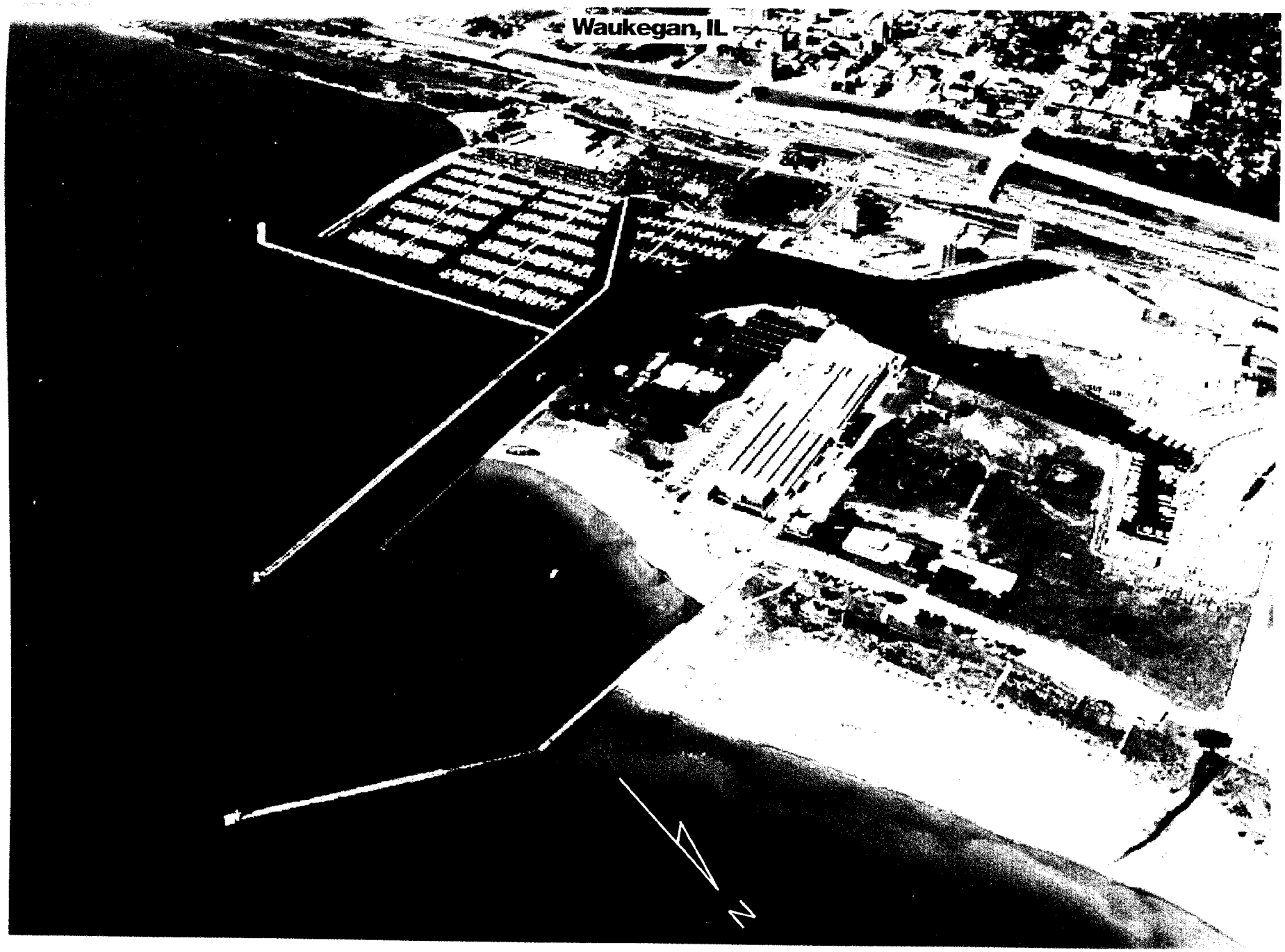
(657) The **State boundary** between Illinois and Wisconsin is about 9 miles N of Waukegan and 7 miles S of Kenosha.

(658) **Prairie Cove** is a small-craft harbor on the Illinois-Wisconsin State boundary. There is a private marina in the harbor. The harbor is marked by private lights and buoys. In August 1993, the reported controlling depth in the harbor was 8 feet. The Harbormaster monitors VHF-FM channels 16 and 9.

(659) **Kenosha Harbor**, 50 miles N of Chicago Harbor at the original mouth of **Pike Creek,** serves as a base for commercial fisherman and pleasure craft. The harbor serves the city of **Kenosha, WI.**

(660) **Prominent features.**–Prominent from the lake are a blue tank on the N side of the entrance channel and a radio tower 3.2 miles WSW of Kenosha Light.

(661) **Kenosha Light** (42°35.4′N., 87°48.5′W.), 50 feet above the water, is shown from a red cylindrical tower on the outer end of the N pier; a fog signal is at the light. Kenosha Light and the light on the SE end of the detached breakwater form a range useful for approaching the harbor entrance.


Waukegan, IL
N

Waukegan, IL
N

(662) **Channels.**–The harbor is entered through a dredged entrance channel leading from deep water in Lake Michigan between parallel piers to an inner harbor basin. A detached breakwater on the N side of the entrance channel protects the entrance from NE seas. The entrance channel is marked by buoys, and the outer ends of the piers and breakwater are marked by lights. In June 1998, the controlling depths were 24 feet in the entrance channel, thence 9½ feet between the piers and revetments, thence 24 feet in the basin except for shoaling to 7 feet in the SW edge, thence 9½ feet (13 feet at midchannel) to the 50th Street bridge.

(663) The entrance channel is subject to shoaling caused by the drift of sand from the N. Severe E gales cause considerable disturbance in the basin. The inner basin is not adapted for anchorage, but vessels may moor to the revetments surrounding it. Mooring to the breakwater or piers is prohibited.

(664) **Caution.**–The original mouth of Pike Creek has been bulkheaded and filled. The creek has been diverted and now enters the harbor basin at the foot of 52nd Street through a 13-foot pipe. The creek flows into the harbor with velocities to 2 mph.

(665) **Bridge.**–The 50th Street bridge at the N end of the dredged part of the basin has a fixed span with a clearance of 16 feet.

(666) **Harbor regulations.**–A **slow no-wake speed limit** exists in the area from the breakwaters at the E end of the harbor entrance to above the 50th street bridge at the end of the basin.

(667) **Kenosha Coast Guard Station** is on the E side of the inner basin.

(668) **Small-craft facilities.**–A large public marina is about 0.4 mile SW of the harbor entrance. The marina is protected by breakwaters and the entrance is marked by private lights. Marinas are also located inside the harbor above and below the 50th Street bridge. Transient berths, gasoline, diesel fuel, water, ice, electricity, limited marine supplies, sewage pump-out, launching ramp, haul-out to 60 tons, and harbormaster services are available.

(669) From Kenosha, the shore is bluff for 10 miles N to Racine. The shoal border is less than 1 mile wide with several detached spots beyond. About 1 mile N of Kenosha, 20- and 23-foot spots are 1 and 1.6 miles offshore, respectively. A wreck, covered 17 feet, is 1.3 miles offshore 3.8 miles N of Kenosha. Detached 21-foot spots are 1 mile and 1.4 miles offshore, 2.4 and 3.8 miles S of Racine, respectively. A stack, 1.2 miles N of Kenosha, is prominent.

(670) **Charts 14904, 14925.–Racine Reef,** SE of the entrance to Racine Harbor, is a large shoal extending from 0.6 to 2.3 miles offshore. The reef has a least depth of 1 foot over a crib near its center. **Racine Reef Light** (42°43.6′N., 87°44.2′W.), 50 feet above the water, is shown from a white skeleton tower on a concrete crib on the E side of the reef; a fog signal is at the light. The light should not be passed close aboard even by shallow-draft vessels. The W end of the reef is marked by a lighted buoy.

(671) **Racine Harbor,** serving the city of **Racine, Wis.,** is at the mouth of the **Root River,** 60 miles N of Chicago Harbor and 21 miles S of Milwaukee Harbor. The harbor is used primarily by pleasure craft and fish tugs.

(672) A small-craft facility is in the S part of the outer harbor basin. A launching ramp basin is just S of the outer harbor basin. The entrances to the basins are marked by lighted buoys and lights.

(673) **Channels.**–From the outer harbor basin, a dredged channel in the Root River leads upstream for about 0.7 mile to just below Fourth Street. In May 1992, the reported controlling depths were 15 feet to the mouth of Root River, thence 11 feet to the Main Street bridge, thence 8 feet near midchannel to the head of the project. Above the dredged channel, depths are about 4 feet to about 200 yards below Marquette Street bridge, thence depths of 1 to 4 feet for about 2.5 miles above Marquette Street bridge. There are rocks on the river bottom just inside the mouth between the N channel limit and the N revetment.

(674) The outer basin is not adapted for anchorage by large vessels but reduces wave action in the lower section of the river. Mooring to the breakwaters and the pier on the N side of the river mouth is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(675) The channel inside the river is narrow and tortuous, making navigation for large vessels difficult. Currents in the river attain velocities to 3 mph.

(676) **Dangers.**–Several detached shoal spots with depths of 21 to 24 feet are 0.3 to 1.1 miles NE of the harbor entrance. Racine Harbor is subject to considerable wave action during periods of strong winds from NE toSE.

(677) **Local bridge regulations.**–In case street traffic is delayed by reason of the draws of either bridge having been continuously opened for 5 minutes or more for the passage of boats, the draws may be closed, but shall be again opened for the passage of boats as soon as practicable; provided however, that no boat shall be delayed for a longer period than 15 minutes.

(678) In case the draw cannot be immediately opened when a signal is given, a red flag or ball by day or a red light at night shall be conspicuously displayed.

(679) All boats when passing any bridge in the city shall be moved past as expeditiously as is consistent with proper movement in the river, and in no case shall any boat, while passing any bridge and obstructing the same, remain or obstruct the passage across such bridge more than 5 minutes, nor shall any boat be so anchored or fastened as to prevent the free and speedy opening of any bridge or the free passage of other boats through the same.

(680) No person shall in any manner obstruct the free passage over and upon the bridges of the city.

(681) No person except the bridgetender or person authorized to act in his stead shall open or in any manner interfere with opening any bridge.

(682) The person having charge of any boat desiring to move past any bridge shall allow a reasonable time for the opening of such bridge, and no person shall move any boat against any bridge or draw thereof before the bridge is opened.

(683) No person shall willfully injure or damage any bridge or abutment, or part thereof. No person shall fasten or hitch any boat, timber or other floating material to any bridge or abutment.

(684) No person shall damage or remove any portion of the improved shore protection of any navigable waters within the city.

(685) Any person who violates any provision of this section shall, upon conviction thereof, be liable for the cost of repairing any damage resulting from such violation, in addition to the penalty provided for violation of this code.

(686) Racine is a **customs port of entry.**

(687) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(688) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(689) **Harbor regulations.**–Federal regulations specify a **speed limit** of 4 mph (3.5 knots) in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

## Structures across Root River at Racine
### *Miles above the mouth of the river
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 1 | Main St. bridge | Highway | 0.31 | | | 90 | 18 | Bascule. Note 1. |
| 2 | State St. bridge | Highway | 0.53 | | | 69 | 12 | Bascule. Notes 1 and 2. |
| 3 | Overhead cable | Power | 0.97 | | | | 53 | |
| 4 | Marquette St. bridge | Highway | 1.17 | 58 | 58 | 58 | 9 | Fixed. |
| 5 | Overhead cable | Power | 1.27 | | | | | Data not available. |
| 6 | Overhead pipeline | | 1.32 | | | 137 | 12 | |
| 7 | Sixth St. bridge | Highway | 1.46 | | | 49 | 24 | Fixed. |
| 8 | Chicago & North Western Ry bridge | Railroad | 1.65 | 107 | 107 | | 17 | Fixed. Note 2. |

Note 1.–See **33 CFR 117.1 through 117.59 and 117.1095,** chapter 2, for drawbridge regulations.
Note 2.–Neither draw is accessible. The depth would only permit passage of very small boats.
Note 3.–In 1986, the bridge was being replaced by a bascule bridge with design clearance of 14 feet at the W channel limit and 19 feet at the E limit.

(690) Local harbor regulations are under the control of the harbor commission and are enforced by the **harbormaster** who can be reached through the Racine County Water Patrol. A **slow-no wake speed** is enforced within the harbor limits. Copies of the regulations can be obtained from the Commissioner of Public Works, City Hall, 730 Washington Avenue, Racine, Wis. 53403.

(691) **Small-craft facilities.**–Marinas at Racine provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Hoists to 25 tons are available for hull, engine, and electronic repairs.

(692) From Racine Harbor, the shore is bluff and curves NE for 3.5 miles to **Wind Point.** Shoals extend about 0.9 mile offshore. Detached 21- and 20-foot depths are 1.1 miles NE and 1.3 miles NNE of the entrance to Racine Harbor. **Wind Point Light** (42°46.9′N., 87°45.5′W.), 111 feet above the water, is shown from a white conical tower with attached dwelling on the point.

(693) **Wind Point South Shoal,** with a least depth of 17 feet, is 1.3 miles SE of Wind Point Light. The shoal is marked on the E side by a buoy.

(694) **Chart 14904.–Wind Point North Shoal,** with boulders covered 14 feet and marked on the SE side by a lighted buoy, is 1.7 miles NE of Wind Point Light. All vessels should keep well outside the buoy, especially in heavy weather.

(695) From Wind Point, the shore trends NW and then N for 18 miles to Milwaukee Harbor. The shore in this stretch is bluff. For the first 7 miles of the stretch, shoals extend about 0.6 mile offshore, thence N to Milwaukee, the shoal border is irregular and extends as much as 1.5 miles from shore. A detached bank with a least depth of 18 feet is from 1.2 to 2 miles offshore in the vicinity of South Milwaukee, about 9.5 miles N of Wind Point. The greatest extent of the shoal border is 3.5 miles SE of the entrance to Milwaukee Harbor and is marked at the outer edge by a lighted bell buoy. Vessels should stay outside the buoy. A wreck, covered 27 feet, is marked by a lighted buoy 5.3 miles NE of South Milwaukee.

(696) **Caution.**–A firing area for small caliber weapons is at the Racine County Line Rifle Club Range about 3.5 miles NW of Wind Point. The firing creates a caution zone about 3,500 feet wide extending about 3 miles into the lake. Mariners should navigate the area with caution and consult the Local Notice to Mariners for latest information.

(697) **Oak Creek Harbor** is a private harbor of the Wisconsin Electric Power Co., about 5.6 miles NW of Wind Point. Two stacks at the powerplant, the northernmost lighted, are prominent from the lake. A fill area for coal storage extends about 900 feet into the lake and has a combined water intake and docking slip along its S side. The S side of the slip is protected by a jetty. In 1977, the reported controlling depth was 21 feet in the approach with 20 feet in the N half of the slip and 15 feet in the S half. In 1993, it was reported that the slip was being maintained to a depth of about 20 feet. Strong currents may exist at the W end of the slip due to a large volume of plant intake water.

(698) About 3 miles N of Oak Creek Harbor, the city of Milwaukee has constructed a sewage treatment plant on a landfill that extends about 1,000 feet into the lake. A stack about 0.5 mile S of the plant is prominent.

(699) **South Milwaukee, Wis.,** is at the mouth of **Oak Creek,** about 8.5 miles S of the entrance to Milwaukee Harbor. Clay bluffs N and S of the creek mouth have an elevation of 60 feet or more. A rock jetty extends lakeward from the N side of the mouth of the creek. A row of submerged piling extends about 200 feet lakeward from the end of the rock jetty. Another pier extends from the S side of the mouth and then bends SW to enclose a small-craft basin. The S side of the basin is enclosed by a breakwater extending from shore. In 1978, the reported controlling depths were 6 feet in the entrance and 4 feet in the basin. Gasoline is available in the basin.

(700) **Charts 14904, 14924.–Milwaukee Harbor,** serving the city of **Milwaukee, Wis.,** is one of the major ports on the Great Lakes. The harbor is at the mouth of the **Milwaukee River,** which flows into **Milwaukee Bay,** a broad indentation on the W side of

Lake Michigan about 80 miles N of Chicago Harbor. The harbor comprises an outer harbor formed by breakwaters paralleling the shore and an inner harbor in Milwaukee River, **Menomonee River,** and **Kinnickinnic River.** The principal cargoes handled in the port are general cargo, steel products, coal, cement, and grain. Freighters and petroleum tankers ply the year round between this port and other ports on S Lake Michigan.

(701) **Prominent features.**–Prominent are lighted television towers 4.5 miles N of the Milwaukee River mouth, the First Wisconsin Center 0.95 mile NNW of the river mouth, a stack 0.4 mile SW of the river mouth, the Allen-Bradley Co. clock and temperature towers 1 mile SW of the river mouth, and an apartment building close SW of the Coast Guard Base at the S end of the outer harbor.

(702) **Milwaukee Breakwater Light** (43°01.6′N., 87°52.9′W.), 61 feet above the water, is shown from a black lantern on a white square structure on the end of the breakwater on the N side of the main entrance channel; a fog signal is at the light.

(703) **Channels.**–Milwaukee outer harbor is protected by a series of breakwaters which generally parallel the shore on either side of the mouth of Milwaukee River. The main entrance to the harbor is through a dredged channel which leads from deep water in Lake Michigan between the breakwaters across the outer harbor to the mouth of the river. The ends of the breakwaters at the main entrance are marked by lights. The breakwater gaps at the N and S ends of the outer harbor are marked by lights. A dredged anchorage basin extends S from the entrance channel between the breakwater and the deep-draft piers along the shore.

(704) The inner harbor is entered from the outer harbor through the piers at the mouth of the Milwaukee River. The outer ends of the piers are marked by lights. The Milwaukee River flows from the N and is joined by the Menomonee River from the W about 1 mile above the pierheads and by the Kinnickinnic River from the S at the inner end of the piers at the NW end of **Jones Island.** Channels have been dredged in the lower parts of the rivers, for about 3 miles in the Milwaukee River, 1.8 miles in the Menomonee River, and 1.3 miles in the Kinnickinnic River. The channels are narrow and tortuous and are not provided with turning basins. Several of the bridge openings are also narrow and their navigation difficult. Channels have also been dredged in the **South Menomonee Canal** and **Burnham Canal,** which branch S from the Menomonee River just above its mouth.

(705) In April 1998, the controlling depth was 26 feet (27 feet at midchannel) from deep water in the lake between the breakwaters and in the entrance channel through the outer harbor to the mouth of Milwaukee River.

(706) In April 1998, the controlling depths in the Milwaukee River were 22 feet (24 feet at midchannel) between the piers to the mouth below the Chicago and North Western Railway bridge, thence 21 feet in the W draw and 21 feet in the E draw of the bridge, thence 18 feet (19 feet at midchannel) to the junction with the Menomonee River, thence 12 feet (13 feet at midchannel) to about 400 feet below St. Paul Avenue bridge; thence in 1977, 17 feet to the upstream limit of the Federal project at the North Humboldt Avenue bridge.

(707) In April 1998, the controlling depths in the Menomonee River were 17 feet (20 feet at midchannel) to North Sixteenth Street bridge, thence 15 feet to about 600 feet below the head of the project just below North Twenty-fifth Street bridge.

(708) In April-May 1998, the controlling depths were 16 feet (19 feet at midchannel) in the South Menomonee Canal; thence in May 1998, 15 feet (19 feet at midchannel) in Burnham Canal.

(709) In April 1998, the controlling depths were 21 feet (25 feet at midchannel) in the entrance to Kinnickinnic River at the junction with Milwaukee River to about 400 feet below the Chicago and North Western Railway bridge, thence 17 feet to the South Kinnickinnic Avenue bridge at the head of the project.

(710) In the outer harbor, mooring to the breakwaters or piers is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by rock riprap along their sides.

(711) In the outer harbor, the city of Milwaukee has dredged an 18-foot approach channel to the Municipal Passenger Pier N of the entrance channel. A private **295°** lighted range marks the approach to the pier. S of the entrance channel, the city has dredged the pier slips on the W side of the anchorage basin. South Slip No. 1 has been dredged to 26 feet and South Slip Nos. 2 and 3 have been dredged to 27 feet.

(712) Municipal Mooring Basin, also known as Kinnickinnic Basin, is on the SE side of the Kinnickinnic River about 0.6 mile above the mouth. The basin, used primarily for the winter moorage of vessels, has general depths of 25 to 30 feet with lesser depths along the edges.

(713) A diked disposal area extends from shore in the SW corner of the outer harbor. The SE corner of the area is marked by a light.

(714) **Anchorages.**–Deep-draft vessels may find anchorage in the dredged part of the outer basin S of the entrance channel. Medium-draft vessels may anchor in the N part of the outer harbor, taking care to avoid dropping or dragging anchor in the vicinity of the submerged cables which cross the outer harbor just N of the entrance channel. Special anchorages are in the small-craft basins at the N end of the outer harbor and shoreward of the County Park Commission's breakwater which parallels the shore S of the outer harbor. (See **33 CFR 110.1 and 110.80,** chapter 2, for limits and regulations.)

(715) In April 1983, sunken wrecks were reported in the special anchorage areas behind the County Park Commission's breakwater 0.2 mile, 174° from South Shore Park Breakwater Light in about 42°59′58″N., 87°53′04″W., and 1.3 miles, 139° from South Shore Park Breakwater Light in about 42°59′17.6″N., 87°52′04.0″W.

(716) **Dangers.**–During rough weather, the entire breakwater system may be obscured by wave action. At these times, the only safe entrance is through the main entrance channel.

(717) A wreck, covered 40 feet, is about 3.8 miles E of the harbor entrance.

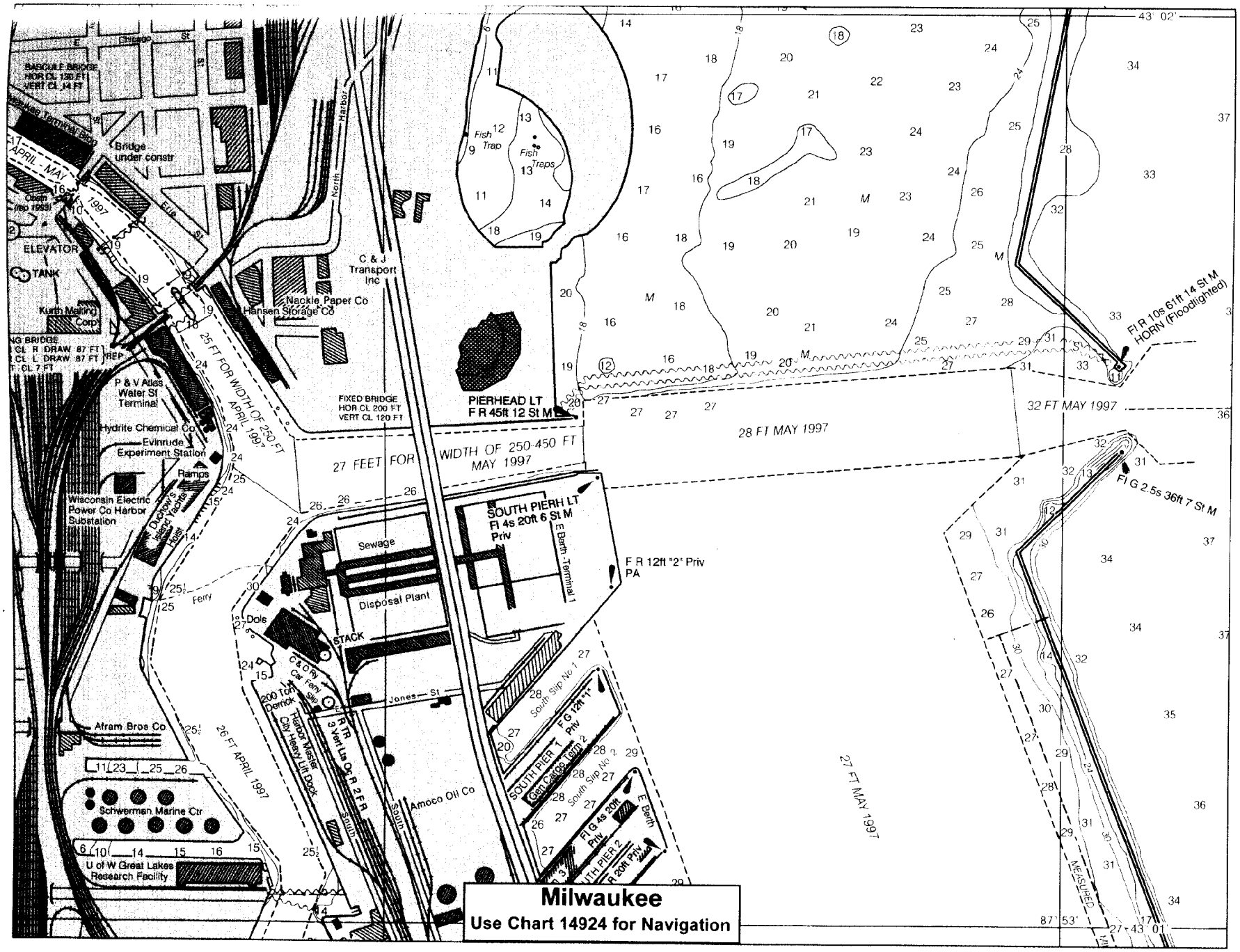
(718) **Caution.**–Fish nets in the N outer harbor are a hazard. A water intake for a sewage disposal plant is on the S side of the Milwaukee River about 800 feet W of the Interstate 794 highway bridge and may, at times, cause hazardous crosscurrents for small vessels.

(719) Navigators are advised to use extreme caution when entering slips of the general cargo terminals in the outer harbor. Ships accidentally penetrating the dock wall or ships having a large rake angle of the bow can strike the steel and concrete superstructure of Interstate 794 highway bridge. This could result in heavy ship or bridge damage and possible personal injury or loss of life.

(720) **Vessels moored in the outer harbor may be subject to severe surging when there are strong NNE to ENE winds. During periods of adverse weather, the Coast Guard recommends that vessels moored in the outer harbor be adequately manned at all times to maintain mooring lines and/or safely get underway.**

(721) **Currents.**–Currents attain velocities to 4 mph in the main entrance channel and 3 mph in the river channels.

Milwaukee, WI



Milwaukee
Use Chart 14924 for Navigation
BASCULE BRIDGE
HOR CL 130 FT
VERT CL 14 FT
Bridge under constr
APRIL - MAY 1997
ELEVATOR
TANK
Kurth Malting Corp
P & V Atlas Water St Terminal
Hydrite Chemical Co
Evinrude Experiment Station
Ramps
Wisconsin Electric Power Co Harbor Substation
Duchow's Island Yachts
Hoist
Ferry
Dols
Afram Bros Co
Schwerman Marine Ctr
U of W Great Lakes Research Facility
25 FT FOR WIDTH OF 250 FT APRIL 1997
26 FT APRIL 1997
Nackle Paper Co
Hansen Storage Co
C & J Transport Inc
FIXED BRIDGE
HOR CL 200 FT
VERT CL 120 FT
27 FEET FOR WIDTH OF 250-450 FT MAY 1997
Sewage
Disposal Plant
STACK
C & O Ry Car Ferry Slip
200 Ton Derrick
Harbor Master City Heavy Lift Dock
R TR 3 Vert Lts Oc R 2 F R
Jones St
Amoco Oil Co
South
North Harbor
Fish Trap
Fish Traps
PIERHEAD LT
F R 45ft 12 St M
SOUTH PIERH LT
Fl 4s 20ft 6 St M
Priv
E Berth - Terminal 1
F R 12ft "2" Priv
PA
South Slip No 1
F G 12ft "1" Priv
SOUTH PIER 1
Gen Cargo Term 2
South Slip No 2
Fl G 4s 20ft Priv
E Berth
SOUTH PIER 2
R 20ft Priv
28 FT MAY 1997
32 FT MAY 1997
27 FT MAY 1997
Fl R 10s 61ft 14 St M
HORN (Floodlighted)
Fl G 2.5s 36ft 7 St M
MEASURED
43° 02'
43° 01'
87° 53'

## Structures across Milwaukee, Menomonee, and Kinnickinnic Rivers
### **Miles above Milwaukee Pierhead Light*
### ***Clear width in feet proceeding upstream*

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Milwaukee River** | | | | | | | |
| 1 | Lake Freeway (I–794) bridge | Highway | 0.19 | | | 200 | 120 | Fixed. Note 2. |
| | Junction with Kinnickinnic River | | 0.38 | | | | | |
| 2 | Chicago & North Western Ry. bridge | Railroad | 0.59 | 87 | 87 | | 7 | Swing. Note 1. |
| 3 | Broadway St. bridge | Highway | 0.79 | | | 100 | 14 | Bascule. Note 1. |
| 4 | Water St. bridge | Highway | 0.94 | | | 130 | 14 | Bascule. Note 1. |
| | Junction with Menomonee River | | 1.01 | | | | | |
| 6 | St. Paul Ave. bridge | Highway | 1.21 | | | 50 | 14 | Vertical lift. Note 1. |
| 7 | East-West Exp. (I–794) bridges | Highway | 1.26 | | | 116 | 28 | Twin fixed. |
| 8 | Clybourn St. bridge | Highway | 1.28 | | | 52 | 14 | Vertical lift. Note 1. |
| 9 | Michigan St. bridge | Highway | 1.37 | | | 50 | 12 | Vertical lift. Clearance up 28 feet. Note 1. |
| 9A | Skywalk | Pedestrian | 1.41 | | | 160 | 32 | Fixed. |
| 10 | Wisconsin Ave. bridge | Highway | 1.46 | | | 50 | 12 | Vertical lift. Clearance up 28 feet. Note 1. |
| 11 | Wells St. bridge | Highway | 1.61 | | | 77 | 9 | Bascule. Note 1. |
| 12 | Kilbourn Ave. bridge | Highway | 1.70 | | | 100 | 14 | Bascule. Note 1. |
| 13 | State St. bridge | Highway | 1.79 | | | 80 | 14 | Bascule. Note 1. |
| 14 | Overhead cable | | 1.88 | | | | | Data not available. |
| 15 | Juneau Ave. bridge | Highway | 2.06 | | | 90 | 14 | Bascule. Note 1. |
| 16 | Park Freeway bridges | Highway | 2.13 | | | 116 | 35 | Twin fixed. |
| 17 | Cherry St. bridge | Highway | 2.29 | | | 80 | 14 | Bascule. Note 1. |
| 18 | Pleasant St. bridge | Highway | 2.58 | | | 50 | 14 | Vertical lift. Clearance up 27 feet. Note 1. |
| 19 | Holton St. bridge | Highway | 2.84 | | | 79 | 64 | Bascule. Note 1. |
| 20 | Humboldt Ave. bridge | Highway | 3.22 | | | | 17 | Fixed. Head of navigation. |
| | **Menomonee River** | | | | | | | |
| 21 | Chicago, Milwaukee, St. Paul & Pacific RR bridge | Railroad | 1.05 | 75 | | | 8 | Swing. Note 1. |
| 22 | North Plankinton Ave. bridge | Highway | 1.08 | | | 90 | 14 | Bascule. |
| 23 | North Sixth St. bridge | Highway | 1.37 | | | 71 | 30 | Bascule. Note 1. |
| 24 | North-South Freeway (I–94) bridge | Highway | 1.61 | | | 140 | 100 | Fixed. |
| 25 | Muskego Ave. bridge | Highway | 1.95 | | | 70 | 10 | Bascule. Note 1. |
| 26 | Sixteenth St. bridge | Highway | 2.14 | | | 120 | 35 | Bascule. Note 1. |
| 27 | Twenty-fifth St. bridge | Highway | 2.8 | 65 | 70 | | | Fixed. Note 3. |
| 28 | Chicago, Milwaukee, St. Paul & Pacific RR bridge | Railroad | 2.91 | | | 9 | | Fixed. Head of navigation. |
| | **South Menomonee Canal** | | | | | | | |
| 29 | South Sixth St. bridge | Highway | 1.51 | | | 77 | 30 | Bascule. Note 1. |
| 30 | North-South Freeway (I–94) bridge | Highway | 1.75 | | | 140 | 100 | Fixed. |
| | **Burnham Canal** | | | | | | | |
| 31 | Chicago, Milwaukee, St. Paul & Pacific RR bridge | Railroad | 1.74 | | 65 | | 8 | Swing. Note 1. |
| 32 | North-South Freeway (I–94) bridge | Highway | 1.79 | | | 95 | 80 | Fixed. |
| 33 | South Eleventh St. bridge | Highway | 1.96 | 46 | 45 | | 7 | Swing. Note 1. |
| | **Kinnickinnic River** | | | | | | | |
| 34 | Chicago & North Western Ry. bridge | Railroad | 1.19 | 61 | 61 | | 8 | Swing. Note 1. |
| 35 | Kinnickinnic Ave. bridge | Highway | 1.67 | | | 100 | 12 | Bascule. Note 1. |
| 36 | Chicago, Milwaukee, St. Paul & Pacific RR bridge | Railroad | 1.67 | 93 | | | 15 | Swing. Note 1. |
| 37 | Chicago & North Western Ry. bridge | Railroad | 1.71 | 93 | | | 15 | Swing. Note 1. |

## Structures across Milwaukee, Menomonee, and Kinnickinnic Rivers (Continued)

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 38 | South First St. bridge | Highway | 1.78 | | | 70 | 14 | Bascule. Note 1. |
| 39 | Overhead cables | Power | 2.00 | | | | 30 | |
| 40 | Becher St. bridge | Highway | 2.02 | | | 50 | 12 | Fixed. |
| 41 | Overhead cable | | 2.09 | | | | | Data not available. |
| 42 | Overhead cable | | 2.11 | | | | | Data not available. |
| 43 | Lincoln Ave. bridge | Highway | 2.30 | | | | 10 | Fixed. Head of navigation. |

Note 1.–See **33 CFR 117.1 through 117.59 and 117.1093,** chapter 2, for drawbridge regulations.
Note 2.–The minimum vertical clearance at the channel limits is 96 feet.
Note 3.–Vertical clearance is 16 feet at N edge of the channel decreasing to 10 feet at the S edge.

(722) **Weather, Milwaukee and vicinity.**–Milwaukee, WI, is located on the western shore of Lake Michigan and in the southeastern portion of the state. The location averages about ten days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 80°F (26.7°C) and an average minimum of 62°F (16.7°C). January is the coolest month with an average high of 27°F (-2.8°C) and an average minimum of 13°F (-10.6°C). The highest temperature on record for Milwaukee is 103°F (39.4°C) recorded in August 1988 and again in July 1995 and the lowest temperature on record is -26°F (-32.2°C) recorded in January 1982. About 139 days each year experience temperatures below 32°F (0°C) and an average 21 days each year records temperatures below 5°F (-15°C). Every month has seen temperatures at or below 40°F (4.4°C) except August and every month except June, July, and August has recorded temperatures below freezing (0°C).

(723) The average annual precipitation for Milwaukee is 32.23 inches (819 mm). An annual maximum occurs during the summer, due mainly to convective activity, and a marked dry period occurs during the winter months. Precipitation falls on about 198 days each year. The wettest month is July with 3.61 inches (92 mm) and the driest, February, averages only 1.44 inches (37 mm). An average of 36 thunderstorm days occur each year with June, July and August being the most likely months. Snow falls on about 77 days each year and averages about 49 inches (1245 mm) each year. January averages about 13 inches (330 mm) per year and December averages nearly 11 inches (279 mm). One foot (305 mm) snowfalls in a 24-hour period have occurred in each month December, January, February and April. About ten days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June through September. Fog is present on average 137 days each year and is rather evenly distributed throughout the year with a slight maximum during the late summer and then again in the early winter.

(724) The prevailing wind direction in Milwaukee is the west-northwest. Spring is the windiest period and a maximum gust of 70 knots occurred in July 1984.

(725) (See page T-12 for **Milwaukee climatological table.**)

(726) **Towage.**–Tugs to 1,600 hp are available at Milwaukee. Arrangements for tugs are made through the Great Lakes Towing Co. dispatcher in Cleveland (800-321-3663) or via VHF-FM remote antenna, or through the JMS Towing Service, Inc. in Sturgeon Bay (414-743-9611).

(727) Milwaukee is a **customs port of entry.**

(728) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(729) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(730) **Coast Guard.**–Milwaukee Coast Guard Station, Group Office, and Base are at the S end of the outer harbor. A **Marine Safety Office** is in Milwaukee. (See appendix for address.)

(731) **Harbor regulations.**–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) Local harbor regulations are enforced by the **harbormaster.** Copies of these regulations may be obtained from the Legislative Reference Bureau, Room 404, City Hall, 200 East Wells Street, Milwaukee, Wis. 53202.

(732) **Wharves.**–Milwaukee has numerous wharves, piers, and docks in the outer harbor and in the Milwaukee, Menomonee, and Kinnickinnic Rivers. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 47, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) Special cargo handling equipment is described with the individual facility. Cranes to 220 tons are available in the harbor. All the facilities have highway connections and some have railway connections. Water and electrical shore-power connections are available at some of the facilities.

(733) **Caution.**–Vessels moored in the outer harbor may be subject to severe surging when there are strong NNE to ENE winds. During periods of adverse weather, the Coast Guard recommends that vessels moored in the outer harbor be adequately manned at all times to maintain mooring lines and/or safely get underway.

(734) **Facilities in the outer harbor:**

(735) **Municipal General Cargo Terminal No. 1 Pier:** 0.2 mile S of the river mouth; 520-foot E face, 23 to 26 feet alongside; 950-foot S face, 25 to 27 feet alongside; deck height, 11 feet; 19,000 square feet covered storage; 12,000 square feet open storage;

receipt of salt; owned by Port of Milwaukee, and operated by Domtar Industries.

(736) **Municipal South Pier No. 1, North Side Open Dock:** 0.3 mile S of the river mouth; 945-foot face; 25 to 27 feet alongside; deck height, 11 feet; 30-ton gantry crane; tank storage for 200,000 barrels; receipt and shipment of conventional and containerized general cargo, dry bulk commodities, steel products, and scrap metals; receipt of petroleum products and liquid chemicals; owned by Port of Milwaukee and operated by Meehan Seaway Service, Ltd, and Product Terminaling of Wisconsin, Inc.

(737) **Municipal South Pier No. 1, General Cargo Terminal No. 2:** 0.35 mile 8 of the river mouth; 330-foot E face, 25 feet alongside; 978-foot S face, 26 to 27 feet alongside; deck height, 11 feet; use of cranes from South Municipal Bulk Cargo Wharf; 33,000 square feet covered storage; tank storage for 200,000 barrels; receipt and shipment of general cargo, dry bulk commodities, steel products, and scrap metals; receipt of petroleum products and liquid chemicals; owned by Port of Milwaukee and operated by Meehan Seaway Service, Ltd., and Product Terminaling of Wisconsin, Inc.

(738) **Municipal South Pier No. 2, General Cargo Terminals Nos. 3, 4, and 4A:** 0.45 mile S of the river mouth; 945-foot N face, 25 to 30 feet alongside; 545-foot E face, 26 to 28 feet alongside; 1,005-foot S face, 26 to 29 feet alongside; deck height, 12 feet; use of cranes from South Municipal Bulk Cargo Wharf; 69,000 square feet covered storage; 180,000 cubic feet cold storage; 1.6 acres open storage plus container storage area; receipt and shipment of general and containerized cargo, steel products, dry bulk commodities, and scrap metal; owned by Port of Milwaukee and operated by Meehan Seaway Service, Ltd.

(739) **Municipal Liquid Cargo Pier:** 0.8 mile S of the river mouth; 1,066-foot N face, 20 to 27 feet alongside; 1,088-foot S face, 20 to 27 feet alongside; deck height, 11 feet; storage tanks for 2 million gallons of vegetable oils and 248,000 barrels of petroleum products; receipt and shipment of vegetable oils, tallow, and animal fats; receipt of petroleum products and liquid fertilizer; owned by Port of Milwaukee, and operated by Milwaukee Liquid Lakes Terminal, Inc. and Tanco Terminals, Inc.

(740) **Facilities in the Kinnickinnic River:**

(741) **Municipal Heavy Lift Dock:** E side of the Kinnickinnic River 0.35 mile above the mouth; 1,659-foot W face; 22 to 28 feet alongside; 160-foot N face; 14 to 25 feet alongside; deck height, 6 feet; cranes to 220 tons; 5 acres open storage; receipt and shipment of general and containerized general cargo and heavy lift commodities, dry bulk commodities, steel products, and scrap metal; owned by Port of Milwaukee and operated by Meehan Seaway Service, Ltd.

(742) **North Municipal Bulk Cargo Wharf:** outer end of E side of Municipal Mooring Basin; 1,270-foot face; 21 to 25 feet alongside; deck height, 6 feet; open storage for 200,000 tons of salt; receipt of salt; owned by Port of of Milwaukee, and operated by Domtar Industries, Inc.

(743) **South Municipal Bulk Cargo Wharf:** inner end of E side of Municipal Mooring Basin; 1,930-foot face; 19 to 25 feet alongside; deck height, 7½ feet; cranes to 96 tons; open storage for 72,000 tons of salt; receipt of bulk salt; owned by Port of Milwaukee, and operated by International Salt Co., Edward E. Gillen Co., and Advance Boiler and Tank Co.

(744) **Municipal West Open Dock:** inner end of W side of Municipal Mooring Basin; 992-foot face, 504 feet of berthing space alongside permanently moored storage vessel; 27 feet alongside; deck height, 6 and 8 feet; cranes to 50 tons with magnets on storage vessel; receipt of pig iron and shipment of scrap metal; owned by Port of Milwaukee and operated by Miller Compressing Co.

(745) **Kinnickinnic Elevator Wharf, Continental Grain Elevator:** outer end of W side of Municipal Mooring Basin; 1,490-foot face; 27 to 28 feet alongside; deck heights, 6 and 9 feet; 3¼-million-bushel grain elevator; one marine leg, unloading rate 12,000 bushels per hour; 6 vessel-loading spouts, loading rate 9,000 bushels per hour each; receipt and shipment of grain; owned by Chicago and North Western Transportation Co. and operated by Continental Grain Co.

(746) **Medusa Cement Co. Dock:** E side of river below Kinnickinnic Avenue bridge; 550-foot face; 17 to 21 feet alongside; deck height, 5 feet; storage silos for 260,000 tons of cement; receipt of bulk cement; owned and operated by Medusa Cement Co.

(747) **Wisconsin Wrecking Co. Wharf:** W side of the river above Chicago and North Western Transportation Co. bridge; 670-foot face; 22 feet alongside; deck height, 7 feet; 8 acres of open storage; receipt and shipment of crushed stone; owned and operated by Wisconsin Wrecking Co.

(748) **Greenfield Avenue Terminal Wharf:** W side of the river, about 0.25 mile below the Chicago and North Western Transportation Co. bridge; 826-foot face, 27 feet alongside; deck height, 5 feet; 13.8 acres of open storage; receipt and shipment of dry bulk materials; owned and operated by Port of Milwaukee.

(749) **Schwerman Trucking Co., East Washington Street Wharf:** S side of slip on W side of river 0.35 mile above the mouth, and N side of the slip just S; 723-foot N face, 27 feet alongside; 1,103-foot S face, 6 to 18 feet alongside; deck height, 4 feet; storage tanks for 432,000 barrels; receipt and shipment of petroleum products; owned by Schwerman Trucking Co. and operated by Schwerman Distribution Center, Inc.

(750) **Afram Bros. Co., South Water Street Dock:** N side of the slip on W side of river 0.35 mile above the mouth, and the riverfront adjacent downstream; 600-foot S face, 12 to 27 feet alongside; 710 feet of berthing space along river, 20 to 24 feet alongside; deck height, 5½ to 6 feet; cranes to 50 tons; 10 acres open storage; shipment and receipt of scrap metal; owned and operated by Afram Bros. Co.

(751) **Facilities in the Milwaukee River:**

(752) **P and V Atlas Terminal Corp., Water Street Terminal Wharf:** W side of the river just above junction with Kinnickinnic River; 630-foot face; 16 to 21 feet alongside; deck height, 10 feet; 51,000 square feet covered storage; receipt of newsprint; owned and operated by P and V Atlas Terminal Corp.

(753) **Facilities in the Menomonee River:**

(754) **St. Mary's Wisconsin Cement, Milwaukee Terminal Dock:** S side of the river 0.1 mile above North Sixth Street bridge; 600-foot face; 17 to 25 feet alongside; deck height, 6 feet; open storage for 20,000 tons of cement clinker; silo storage for 22,000 tons of cement; receipt of cement clinker; owned and operated by St. Mary's Wisconsin Cement, Inc., Division of St. Mary's Cement, Ltd.

(755) **Wisconsin Electric Power Co., Valley Plant Canal Street Coal Dock:** S side of the river 0.2 mile above North-South Freeway (I-94) bridge; 500-foot face; 18 to 21 feet alongside; deck height, 6 feet; open storage for 30,000 tons of coal; occasional receipt of coal; owned and operated by Wisconsin Electric Power Co.

(756) **Schwerman Trucking Co., 17th Street Wharf:** N side of the river above the Sixteenth Street bridge; 3,000-foot face; 14 to 19 feet alongside; deck height, 4 feet; open storage for 80,000 tons of salt; storage tanks for 1,000,000 gallons; receipt of salt, stone

and liquid chemicals; owned by Schwerman Trucking Co. and operated by Schwerman Distribution Center, Inc. and Milwaukee Solvents and Chemical Corp.

(757) **Facilities in South Menomonee Canal:**

(758) **Lake Shore Sand Milwaukee Plant Dock:** W side of the mouth of the canal; 331 feet of berthing space; 12 to 18 feet alongside; deck height, 6 feet; open storage for 80,000 tons of sand; receipt of sand; owned and operated by Lake Shore Sand, Division of Construction Aggregates Corp. of Michigan.

(759) **Morton Salt, Milwaukee Plant Dock:** N side of canal immediately above Lake Shore Sand Dock; 478-foot face; 14 feet alongside; deck height, 3 to 5 feet; covered storage for 4,000 tons of salt; open storage for 40,000 tons of salt; receipt of salt; owned and operated by Morton Salt Division, Morton Thiokol, Inc.

(760) **Wisconsin Electric Power Co., Valley Plant Main Coal Dock:** N side of the canal above North-South Freeway bridge; 575-foot face; 18 to 21 feet alongside; deck height, 7½ feet; open storage for 250,000 tons of coal; receipt of coal; owned and operated by Wisconsin Electric Power Co.

(761) **Schneider Fuel and Supply Co., Canal Street Dock:** N side just below the head of the canal; 290-foot face; 17 feet alongside; deck height, 3 to 4 feet; open storage for 30,000 tons of coal; receipt of coal; owned by Schneider Fuel and Supply Co. and operated by Wisconsin Electric Power Co.

(762) **Cargill Elevator E Wharf:** S side just below the head of the canal; 910-foot face; 21 feet alongside; deck height, 6 to 6½ feet; 2½-million-bushel grain elevator; one marine leg, unloading rate 7,000 bushels per hour; two loading spouts, combined rate 26,000 bushels per hour; receipt and shipment of grain; owned and operated by Cargill, Inc.

(763) **Facilities in Burnham Canal:**

(764) **Huron Cement, Milwaukee Terminal Wharf:** N side of the canal below South Eleventh Street bridge; 400-foot face; 19 to 21 feet alongside; deck height, 3 feet; silo storage for 18,000 tons of cement; receipt of bulk cement; owned by Huron Cement, Division of National Gypsum Co. and operated by Huron Cement and J.M.S. Towing Services, Inc.

(765) **Dundee Cement Co., Milwaukee Terminal Wharf:** S side of the canal above South Eleventh Street bridge; 319-foot face; 16 to 18 feet alongside; deck height, 4 feet; silo storage for 10,000 tons of cement; receipt of bulk cement; owned and operated by Dundee Cement Co.

(766) **Supplies.**–All types of marine supplies and provisions are available in Milwaukee. Bunker fuel and diesel oil are available by truck to facilities on Jones Island. Water is available at all the municipal docks and at some of the private facilities.

(767) **Repairs.**–There are no facilities for drydocking deep-draft vessels at Milwaukee. Two companies on the E side of the Municipal Mooring Basin perform above-the-waterline and major engine repairs. Another company maintains portable equipment for making above-the-waterline repairs to vessels at their berths.

(768) **Small-craft facilities.**–S of the outer harbor, a series of breakwaters parallels the SW shore of Milwaukee Bay for about 2 miles. The basin thus formed provides good anchorage for small-craft, and gasoline and diesel fuel are available at the yacht club at the N end. The basin may be entered from the S end of the outer harbor, marked by a light, or through a breakwater gap marked by a lighted buoy about 0.7 mile S of the outer harbor. The open S end of the basin and the small breakwater gap 0.45 mile NW should not be used without local knowledge.

(769) The municipal marina at the N end of the outer harbor provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and launching ramps. A marina on the W side of the mouth of Kinnickinnic River provides gasoline, diesel fuel, sewage pump-out, and marine supplies. A 60-ton stiff-leg crane is available for complete hull and engine repairs. A repair yard on the E side of Kinnickinnic River 1.1 miles above the mouth has a 20-ton hoist and makes hull and small engine repairs.

(770) **Ferries.**–A ferry crosses the Kinnickinnic River at the NW end of Jones Island. A ferry that carries automobiles and railroad cars operates between Milwaukee and Ludington from a terminal on the W side of Jones Island about 0.5 mile SW of South Pierhead Light.

(771) **Communications.**–Milwaukee has excellent highway and rail freight connections. General Mitchell Field at the S end of the city provides freight and passenger air service.

(772) **North Point,** about 3 miles N of the entrance to Milwaukee Harbor, is the N point of Milwaukee Bay. **North Point Light** (43°03.9′N., 87°52.3′W.), 154 feet above the water, is shown from a white octagonal tower with a red roof on the point.

(773) **Caution.**–A small arms firing range is on the lakefront about 1,800 feet NE of North Point Light. Daily firing creates a caution zone extending 1,200 feet SE into Lake Michigan. The zone is 1,200 feet wide at its outer end and 500 feet wide at the shoreline. Guards are posted to signal cease firing when necessary, but mariners are advised to consult Local Notices to Mariners for schedules of firing and instructions.

(774) **Chart 14904.–Whitefish Bay** is a slight recession in the shoreline between North Point and **Fox Point,** 6.5 miles N. The shoal border around the bay is about 0.7 mile wide. Submerged net stakes extend about 0.9 mile from shore.

(775) From Fox Point N for 15 miles to Port Washington, the shore is a steep bluff about 100 feet high. Shoals extend 0.5 to 1 mile offshore. A wreck, covered 1 foot, is 0.6 mile offshore 3.3 miles N of Fox Point. A bell tower, reported to resemble a spire, is prominent about 6 miles N of Fox Point.

(776) **Port Washington, Wis.,** is an artificial harbor about 25 miles N of Milwaukee Harbor. **Sauk Creek,** a very small stream, enters the S side of the harbor at the inner end of the coal wharf.

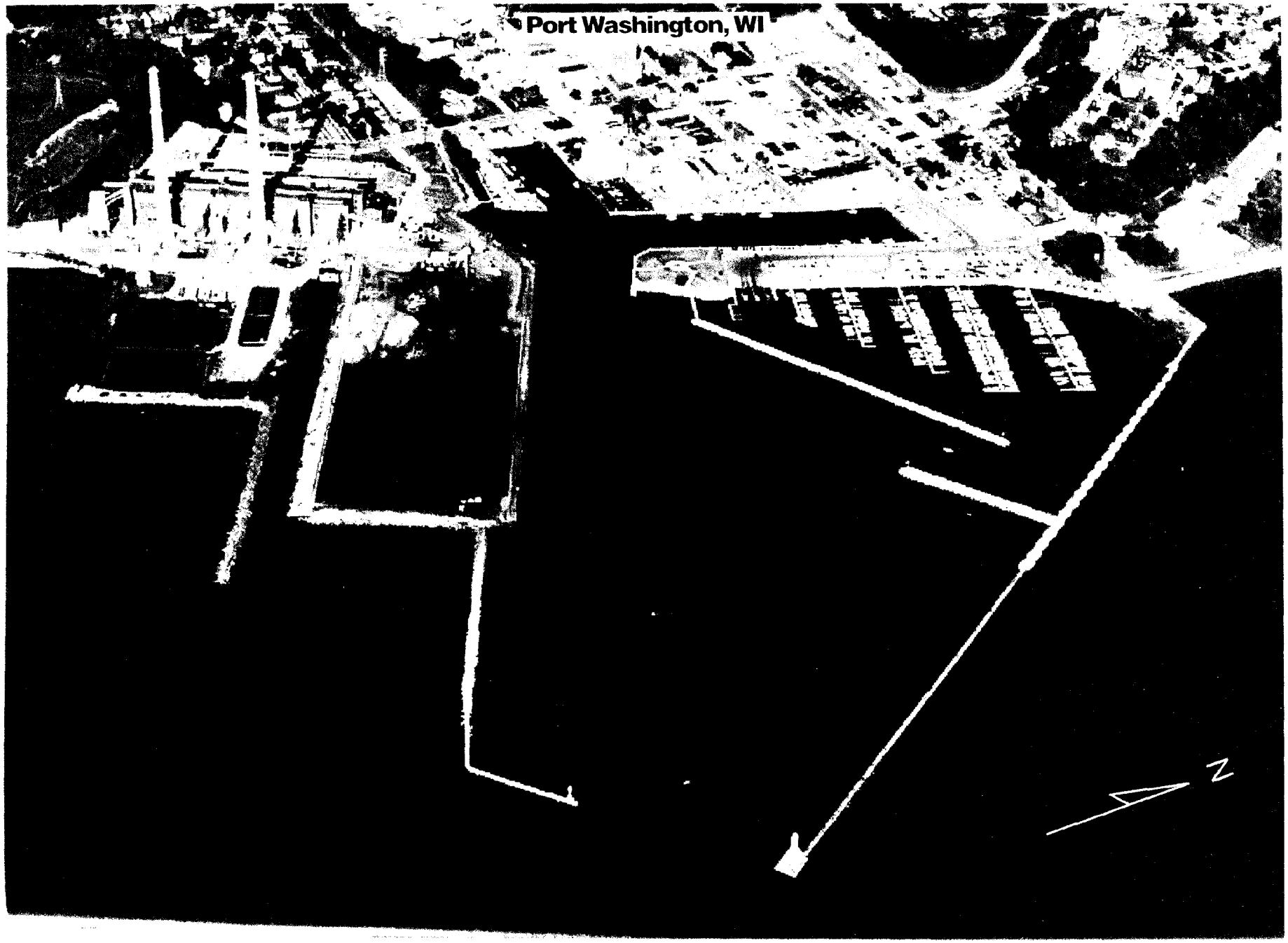
(777) **Prominent features.**–Prominent are the powerplant stacks on the S side of the harbor and spires NW of the inner end of the N breakwater.

(778) **Port Washington Breakwater Light** (43°23.1′N., 87°51.6′W.), 78 feet above the water, is shown from a white square tower on a concrete base on the outer end of the N breakwater; a fog signal is at the light.

(779) **Channels.**–A dredged entrance channel leads from deep water in Lake Michigan to an outer basin protected on the N by a breakwater and on the S by a breakwater and coal wharf. The outer ends of the breakwaters are marked by lights and the NE corner of the coal wharf is marked by a private light. From the W end of the outer basin, the channel leads to two inner basins. In May 1998, the controlling depths were 21 feet from deep water to the outer basin with 15 to 21 feet in the outer basin; thence in 1996, 10 feet in the W inner basin and 15 feet in the N basin.

(780) The intake channel of the Wisconsin Electric Power Co. is 1,200 feet SW of the harbor entrance. The S side of the channel is protected by a jetty, marked on the outer end by a private light. An overhead power cable with unknown clearance crosses the mouth of the channel.

(781) **Caution.**–Power company cooling water is discharged into the harbor in the vicinity of Sauk Creek and creates a very dangerous current across the entrance to the W inner basin. Extreme caution should be exercised when maneuvering in this vicinity. With 30 minutes advance notice of vessel arrival in the


Port Washington, WI
N

harbor, the Wisconsin Electric Power Co. will reduce cooling water discharge at the request of the vessel master and will make arrangements to handle lines when entering or leaving harbor. The power company can be contacted via the marine operator or by telephone, 414–284–5161, 24 hours a day.

(782) In April 1983, a dangerous wreck was reported about 0.4 mile, **335°** from Port Washington Breakwater Light in 43°23′27.4″N., 87°51′46.6″W.

(783) **Harbor regulations.**–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

(784) **Wharves.**–Wisconsin Electric Power Co. receives coal at the 1,175-foot wharf on the S side of the outer basin. The wharf has a reported controlling depth of 22 feet alongside and a deck height of 13 feet. A bucket unloader operates at 600 tons per hour from vessels to a 600,000-ton coal storage area.

(785) Murphy Oil Co. receives gasoline and heating oil at a 300-foot wharf on the W side of the N inner basin. The wharf has a reported controlling depth of 18 feet alongside and deck height of 10 feet. There is tank storage for 180,000 barrels.

(786) **Small-craft facilities.**–A small-craft basin, protected by breakwaters, is in the NW corner of the outer basin. The outer ends of the breakwaters are marked by lights. Transient berths, gasoline, water, and electricity are available on the N side of the W inner basin. Launching ramps are in the N end of the outer basin. A sewage pump-out facility is in the N inner basin. In May 1998, the controlling depth was 10 feet in the entrance channel to the small-craft basin, thence 6 to 8 feet in the basin.

(787) **Charts 14904, 14903.**–From Port Washington for about 26 miles NNE to Sheboygan, the shore is bold. Shoals extend about 0.6 mile offshore, and numerous net stakes are within 2 miles of shore. A wreck, covered 26 feet, is 0.9 mile from shore 8.2 miles NNE of Port Washington. A sunken caisson, covered 16 feet, is 0.6 mile offshore 8 miles SSW of Sheboygan. Tanks at Belgium, Cedar Grove, and Oostburg, Wis., are prominent.

(788) **Charts 14903, 14922.–Sheboygan, Wis.,** is a port city about 51 miles N of Milwaukee Harbor at the mouth of the **Sheboygan River.**

(789) **Sheboygan Breakwater Light** (43°45.0′N., 87°41.5′W.), 55 feet above the water, is shown from a red cylindrical tower on the outer end of the breakwater on the N side of the entrance channel; a fog signal is at the light.

(790) **Caution.**–A Sheboygan Police Department firing zone is about 2 miles S of the S pier at Sheboygan Harbor. The firing area is 3,500 feet wide and extends about 3 miles lakeward. Firing is conducted from 0600 to 2100 7 days a week, year round; red flags are displayed while firing is in progress. Extreme caution is advised.

(791) **Channels.**–A dredged entrance channel leads NW from deep water in Lake Michigan between a breakwater on the N and a pier on the S to an outer harbor turning basin. The outer ends of the breakwater and pier are marked by lights. The channel leads across the S side of the basin to the mouth of Sheboygan River and thence upstream for about 1 mile. The N side of the river mouth is marked by a light. A radiobeacon is near the **Sheboygan Coast Guard Station** in 43°45.0′N., 87°42.2′W.

(792) In May 1998, the controlling depths were 16 feet in the S half and 18 feet in the N half of the entrance channel to the outer basin, thence 15 feet in the N part of the basin and 10 feet in the S part of the basin except for severe shoaling to 2 feet along the S

## Structures across Sheboygan River
### **Miles above North Pierhead Light*
### ***Clear width in feet proceeding upstream*

| *No.* | *Location and Name* | *Kind* | *Miles** | *Clear width in feet of draw or span openings*** | | | *Clear height in feet above Low Water Datum* | *Remarks* |
|---|---|---|---|---|---|---|---|---|
| | | | | *Right* | *Left* | *Center* | | |
| 1 | S. Eighth St. bridge | Highway | 0.69 | | | 75 | 14 | Bascule. Note 1. |
| 2 | Overhead cable | | 0.77 | | | | | Data not available. |
| 3 | Overhead cable | Power | 0.87 | | | | 141 | |
| 4 | Pennsylvania Ave. bridge | Highway | 1.14 | | | 38 | 19 | Fixed. |
| 5 | Overhead cable | | 1.22 | | | | | Note 2. |
| 6 | Overhead cable | | 1.56 | | | | | Data not available. |
| 7 | Chicago & North Western Ry. bridge | Railroad | 1.57 | 60 | 60 | | 20 | Fixed. |
| 8 | Overhead cable | | 1.64 | | | | | Data not available. |
| 9 | Fourteenth St. bridge | Highway | 1.65 | | | 54 | 14 | Fixed. |
| 10 | Chicago & North Western Ry. bridge | Railroad | 2.29 | | | | | Fixed. Data not available. |
| 11 | Overhead cable | | 2.30 | | | | | Data not available. |
| 12 | Overhead cable | | 2.35 | | | | | Data not available. |
| 13 | New Jersey Ave. bridge | Highway | 2.36 | | | | | Fixed. Data not available. |

Note 1.– See 33 CFR 117.1 through 117.59 and 117.1097, chapter 2, for drawbridge regulations.
Note 2.– Cable extends from W side of the river to an island at midchannel.

Sheboygan, WI
N

edge near the mouth of the river; thence 5 feet (6 feet at midchannel) from the mouth of the river to the Eighth Street bridge, thence 4 feet, except for shoaling to 2 feet along the N edge just above the Eighth Street bridge, to the head of the project at Jefferson Street.

(793) The entrance channel is subject to shoaling caused by the drift of sand from the S.

(794) Currents in the river attain velocities up to 3 mph.

(795) The outer basin is not adapted for anchorage, but greatly reduces wave action in the lower river. Mooring to the breakwater or piers is prohibited. Mariners are cautioned against navigating outside channel limits in the the vicinity of structures protected by stone riprap.

(796) **Bridge regulations.**–All watercraft navigating the Sheboygan River and harbor or other navigable waters connected herewith within the limits of the city of Sheboygan, when passing any bridge in said city, shall move or be moved past the same as expeditiously as is consistent with the proper use of the river by other watercraft; but in no case shall any watercraft, while passing through any bridge, remain or obstruct the passageway more than 5 minutes, and no watercraft shall be so anchored or fastened as to prevent any bridge from a free and speedy opening. Any master or other person having charge of any watercraft, who shall violate any provisions in this section, shall forfeit and pay for each offense a penalty of not less than $5 nor more than $25.

(797) **Time allowed for opening bridge.**–Whenever any person having charge of any watercraft shall wish to move the same past any bridge, reasonable time shall be allowed for the opening of the same; and any person who shall move any watercraft against any bridge, or the center or protection pier thereof, before the same shall be opened, to the injury thereof, shall forfeit and pay for each offense a penalty of not less than $5 nor more than $50, and shall likewise be liable to the city of Sheboygan for all damages done to the bridge and center or protection piers thereof.

(798) **Towage.**–Tugs are available from Milwaukee and Sturgeon Bay. (See Towage under those ports.)

(799) Sheboygan is a **customs port of entry.**

(800) **Sheboygan Coast Guard Station** is on the N side of the mouth of Sheboygan River.

(801) **Harbor regulations.**–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

(802) Local harbor regulations are enforced by the **harbormaster** who can be reached through the Department of Public Works, City Hall, Sheboygan, Wis. 53081. A **speed limit** of 4 mph (3.5 knots) is enforced within the harbor limits. Copies of the regulations may be obtained from the harbormaster.

(803) **Wharf.**–Reiss Coal Co. receives coal at their wharf on the S side of the river, from the mouth upstream to the Eighth Street bridge. There is a total of 3,120 feet of berthing space; the longest face is 1,330 feet long. The reported controlling depth alongside is 19 to 20 feet, and the deck height is 7½ to 8 feet. There is storage for 1½ million tons of coal. Continental Oil Co. receives oil and alcohol by barge at the W end of the wharf.

(804) **Small-craft facilities.**–Marinas in the Sheboygan River provide transient berths, gasoline, diesel fuel, water, ice, launching ramp, electricity, sewage pump-out, and limited marine supplies. Hoists can handle 35-foot boats for engine and minor hull repairs.

(805) From Sheboygan, the shore is a moderate bluff for 24 miles NNE to Manitowoc. The shoal border in this stretch is up to 1.4 miles wide and has scattered rocks and boulders covered 8 to 12 feet near the outer edge. **Sheboygan Reef,** with depths of 4 to 18 feet and marked on the E side by a buoy, is 0.6 mile N of Sheboygan Breakwater Light. A dangerous boulder, covered 2 feet, is 0.7 mile offshore 9.6 miles N of Sheboygan. A dangerous submerged rock is 1 mile offshore at the village of Northeim, Wis., 17 miles N of Sheboygan.

(806) **Chart 14903.–Caution.**–The Sheboygan Rifle and Pistol Club, Inc., conducts firing daily on the lakefront about 5.5 miles N of the entrance to Sheboygan harbor. This firing creates a caution zone about 3,500 feet wide extending 3 miles lakeward from the shoreline. Mariners are advised to consult Local Notices to Mariners for schedules of firing and instructions.

(807) **Cleveland, Wis.,** formerly **Hika,** is 11.5 miles N of Sheboygan. In 1978, only a natural ramp and a small pier with shallow water alongside were available for boats at Cleveland.

(808) Pilings that bare are about 275 yards offshore in about 43°59.6′N., 87°41.5′W. Caution should be exercised in the area.

(809) **Charts 14903, 14922.–Manitowoc, Wis.,** is a port city at the mouth of **Manitowoc River,** about 75 miles N of Milwaukee Harbor. The most prominent feature at Manitowoc is the lighted elevator 0.6 mile SW of Manitowoc Breakwater Light. The lighted stack 0.5 mile S of the elevator has horizontal red and white bands.

(810) **Manitowoc Breakwater Light** (44°05.6′N., 87°38.6′W.), 52 feet above the water, is shown from a white cylindrical building on the outer end of the N breakwater; a fog signal is at the light.

(811) **Channels.**–A dredged entrance channel leads from deep water in Lake Michigan between converging breakwaters through Manitowoc Harbor to the mouth of the Manitowoc River, and thence upstream for about 1.7 miles to a point about 200 feet below the Chicago & North Western Railway bridge. The outer ends of the breakwaters and the N side of the river mouth are marked by lights. In May-June 1998, the controlling depths were 15 feet (20 feet at midchannel) between the breakwaters and through Manitowoc Harbor to the mouth of the river except for shoaling to 13 feet in the NW corner of the harbor, thence 14 feet (20 feet at midchannel) through the river to the first Soo Line Railroad bridge, thence 17 feet (19 feet at midchannel) to a point about 700 feet below the second Soo Line Railroad bridge, thence 7½ feet to the head of the project.

(812) A small-boat basin, entered through an opening in the N breakwater, is about 0.25 mile above Manitowoc Breakwater Light. The E side of the entrance is protected by a short jetty, marked at its outer end by a light. The ends of the breakwater are marked by a light and a daybeacon. In May-June 1998, the controlling depth was 10 feet at midchannel in the entrance and through the breakwater with 8 to 10 feet in the channel E of the piers except for shoaling to 4 feet at the N end of the channel.

(813) The river channel is quite winding and should be navigated with care. The river banks are generally hardpan and firm clay, quite stony in places.

(814) Above the dredged channel, the river has depths of 6 feet in the NW half and 10 feet in the SE half to the Chicago and North Western Railway bridge except for a 5-foot shoal extending downstream from the center bridge pier, thence about 4 feet to the Twenty-first Street bridge, and thence about 3 feet to the third Soo Line Railroad bridge.

(815) Manitowoc Harbor is not adapted for anchorage, but reduces wave action in the lower section of the river. Mooring to the breakwaters is prohibited. Mariners are cautioned against navigating outside the channel limits in the vicinity of structures protected by stone riprap.

(816) The currents in the river attain velocities up to 3 mph.

## Structures across Manitowoc River
### *Miles above the mouth of the river
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 1 | Eighth St. bridge | Highway | 0.29 | | | 120 | 12 | Bascule. Note 1. |
| 2 | Tenth St. bridge | Highway | 0.43 | | | 120 | 14 | Bascule. Note 1. |
| 3 | Soo Line RR bridge | Railroad | 0.91 | | | 93 | 6 | Bascule. Notes 1 and 2. |
| 4 | Soo Line RR bridge | Railroad | 1.60 | 61 | 61 | | 6 | Hand-operated swing. Seldom opened. |
| 5 | Chicago & North Western Ry. bridge | Railroad | 1.75 | 60 | 60 | | 11 | Fixed. |
| 6 | Overhead cable | Power | 1.76 | | | | 84 | |
| 7 | Overhead cable | Power | 1.86 | | | | 64 | |
| 8 | Overhead cables | Power | 1.95 | | | | 84 | |
| 9 | Twenty-first St. bridge | Highway | 1.97 | | | 107 | 16 | Fixed. |
| 10 | Overhead cables | | 2.02 | | | | | Data not available. |
| 11 | Overhead cable | | 2.30 | | | | | Data not available. |
| 12 | Soo Line RR bridge | Railroad | 2.33 | 45 | 45 | | 11 | Fixed. Head of navigation. |

Note 1.–See **33 CFR 117.1 through 117.59 and 117.1089,** chapter 2, for drawbridge regulations.

Note 2.–No bridgetender is on duty on Saturdays or Sundays and from 2000 to 0400 on weekdays from about December 15 to March 15 annually. Bridge will be opened on 2-hour advance notice; from 0630 to 1530 telephone the telegraph operator, 648–6861, and at all other times call the Soo Line section foreman, 414–722–4228.

(817) An irregularly shaped diked disposal area extends 1,700 feet N from the N side of the N breakwater.

(818) **Caution.–Manitowoc Shoal,** on the S side of the approach to the harbor, has a least depth of 14 feet about 0.65 mile SE of Manitowoc Breakwater Light. The NE side of the shoal area is marked by a buoy. A shoal with a least depth of 14 feet is about 1.2 miles SE of the the breakwater light.

(819) **Towage.**–Tugs are available from Milwaukee, Sturgeon Bay, and Green Bay. (See Towage under those ports.)

(820) Manitowoc is a **customs port of entry.**

(821) **Harbor regulations.**–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

(822) Local harbor regulations are under the control of the Harbor Commission and are enforced by the **harbormaster** who can be reached through the Board of Harbor Commissioners, City Hall, 817 Franklin Street, Manitowoc, Wis. 54220. Copies of the regulations can be obtained from the Board of Harbor Commissioners. A **speed limit** of 4 mph (3.5 knots) is enforced within the harbor limits.

(823) **Wharves.**–Manitowoc has several deep-draft facilities along the Manitowoc River. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) The facilities described have highway connections and some have railway connections. Some of the facilities have water and electrical shore-power connections.

(824) **C. Reiss Coal Co. Dock:** W side of the slip extending S at the river mouth; 900-foot face; 17 to 23 feet alongside; deck height, 8 feet; open storage for 175,000 tons of coal; receipt of coal; owned and operated by C. Reiss Coal Co.

(825) **Anheuser-Busch, Grain Dock:** S side of the river 700 feet above the mouth; 190-foot face; 19 feet alongside; deck heights, 4 and 6 feet; silo storage for over 4 million bushels of grain; one marine leg, unloading rate 9,500 bushels per hour; one vessel-loading spout, loading rate 12,500 bushels per hour; receipt of grain; owned and operated by Anheuser-Busch, Inc.

(826) **The Manitowoc Co., Berths A and B:** W side of the river 0.15 mile above the first Soo Line Railroad bridge; Berth A, 450-foot face, 21 feet alongside; Berth B, 680-foot face, 16 to 18 feet alongside; deck height, 3½ feet; shipment of heavy machinery; owned and operated by The Manitowoc Co., Inc.

(827) **The Manitowoc Co., Berths C and D:** W side of the river 0.3 mile above the first Soo Line Railroad bridge; Berth C, 260-foot face, 14 to 16 feet alongside; Berth D, 360-foot face, 14 to 16 feet alongside; deck height, 3½ feet; 75-ton stiff-leg derrick; shipment of heavy-lift items; owned and operated by The Manitowoc Co., Inc.

(828) **Medusa Cement Co. Wharf:** NW side of the river at the upper end of the dredged channel; 1,200-foot face; 20 feet alongside; deck height, 6 feet; silo storage for 53,000 tons of cement; receipt of bulk cement; owned and operated by Medusa Cement Co.

(829) **Small-craft facilities.**–Transient berths, electricity, water ice, gasoline, diesel fuel, marine railway with lift capacity of 3[illegible] tons for vessels up to 70 feet for hull and engine repairs, sewage pump-out facilities, and a launching ramp are available on the [illegible] side of the river mouth.

(830) **Ferries.**–Ferries that carry passengers, autos, and railroad cars operate from the E side of the slip at the river mouth to Ludington, Mich., and from the N side of the river 0.5 mile above the mouth to Frankfort. Mich.

(831) **Supplies and repairs.**–Large vessels do not normally bunker or take on supplies at Manitowoc. Bunker oil can be supplied by tank truck. Emergency above-the-waterline repairs are available.

(832) **Chart 14903.**–The shore trends 5.7 miles NE from Manitowoc to Two Rivers. A shoal with a least depth of 8 feet and marked on the SE side by a buoy is 1 mile NE of Manitowoc Breakwater Light. Otherwise, the 18-foot contour is within 0.5 mile of shore in this stretch. Net stakes extend about 1.5 miles from shore.

(833) **Two Rivers, Wis.**, is a town and harbor at the mouth of the **Twin Rivers,** about 80 miles N of Milwaukee Harbor. The harbor is used mainly by local fish tugs and recreational craft.

(834) **Prominent features.**–Prominent are two white tanks with black tops 3,100 feet WNW of the harbor entrance, a stack 650 feet NE of the tanks, a spire 1,700 feet NE of the tanks, and a lighted silver tank with "Twin Rivers" in black letters 0.9 mile NNE of the harbor entrance.

(835) **Channels.**–A dredged entrance channel leads NW from deep water in Lake Michigan between parallel piers to a harbor basin at the confluence of **East Twin River** and **West Twin River** and thence upstream in East Twin River for about 0.5 mile to the 22nd Street bridge. The outer ends of the piers are marked by lights and the rivers are partially marked by private buoys; the buoys are unnumbered and are shifted to mark the best water. In September 1998, the controlling depths were 10 feet through the entrance channel and between the piers to the basin, thence 11 to 17 feet in the basin, thence 5½ feet (7 feet at midchannel) in East Twin River to about 20th Street, thence 3½ feet to the head of the project at about the 22nd Street bridge. The entrance channel is subject to shoaling, especially during the winter and after severe storms.

(836) A small basin at the shoreward end of the N pier is not used by vessels, but reduces wave action in the inner harbor. The inner basin is not adapted for anchorage, and mooring to the piers and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(837) Currents in the river attain velocities up to 3 mph.

(838) West Twin River has depths of about 9 feet in the S part of the channel from the basin to Washington Street bridge. The nominal head of navigation on the East and West Twin Rivers is 3 and 7 miles, respectively, from the mouth, the navigable depth being not over 4 feet. Only small recreational craft operate on these rivers above the dredged channels.

(839) **Bridge regulations.**–(a) Notice to Open Bridges Required. The operator of any boat desiring to pass through any bridge in the city of Two Rivers shall notify the city of his intention to pass through such bridge, and the city employees shall be allowed a reasonable time thereafter to open such bridge.

(840) (b) Bridges on West Twin River. To avoid traffic congestion, the bridges on the West Twin River shall not be opened between 6:30 a.m. and 7:00 a.m., 7:30 a.m. and 8:00 a.m., 11:55 a.m. and 1:00 p.m., 3:30 p.m. and 4:15 p.m. and 4:45 and 5:15 p.m. on any day except Saturday, Sunday, and holidays when they may be opened at anytime.

(841) Request to open bridges should be given to the Two Rivers Police Department, telephone 414–793–1155, via land telephone or marine operator.

## Structures across East and West Twin Rivers
### **Miles above North Pierhead Light*
### ***Clear width in feet proceeding upstream*

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **East Twin River** | | | | | | | |
| 1 | 17th St. bridge | Highway | 0.48 | | | 70 | 14 | Bascule. |
| 2 | 22nd St. bridge | Highway | 0.82 | | | 70 | 9 | Bascule. |
| 3 | Overhead cable | | 1.22 | | | | 25 | |
| | **West Twin River** | | | | | | | |
| 4 | Washington St. bridge | Highway | 0.53 | | | 55 | 15 | Fixed. |
| 5 | Chicago & North Western Ry. bridge | Railroad | 0.62 | 50 | 50 | | 12 | Swing. |
| 6 | Overhead cables | Power | 0.62 | | | | 95 | |
| 7 | 16th and Madison Sts. bridge | Highway | 0.81 | | | 70 | 14 | Bascule. |
| 8 | Overhead cable | | 0.91 | | | | 37 | |

(842) **Two Rivers Coast Guard Station** is on the NE side of the entrance channel.

(843) **Harbor regulations.**–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

(844) **Small-craft facilities.**–A marina on the S side of the West Twin River provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 40-ton crane is available for engine and electronic repairs.

(845) **Rawley Point** is a broad, rounding, wooded point NE of Two Rivers. **Rawley Point Light** (44°12.7′N., 87°30.5′W.), 113 feet above the water, is shown from a white cylindrical tower on the point, 5.3 miles NE of Two Rivers. Between Two Rivers and Rawley Point Light, shoals extend about 0.8 mile from shore. Net stakes reach over 2 miles from shore.

(846) From Rawley Point Light the moderately bluff shore trends generally N for about 17 miles to Kewaunee. Rocky shallows extend about 1 mile from shore. A dangerous wreck that bares is about 1.5 miles north of Rawley Point Light in about 44°13.9′N., 87°30.2′W. Extreme caution should be exercised in the area. Point Beach Nuclear Power Plant, 5 miles N of Rawley Point Light, has a square green building prominent from offshore. Kewaunee Nuclear Power Plant is on **Observation Point,** 9 miles N of Rawley Point Light. The cooling tower at the plant is prominent.

(847) **Kewaunee Shoal** is a hard gravel and boulder reef extending about 1.8 miles E from shore just S of the entrance to Kewaunee harbor. The shoal has a least depth of 13 feet near the outer end. **Kewaunee Shoal Light** (44°27.1′N., 87°27.9′W.), 43 feet above the water, is shown from a white cylindrical tower with green band on the outer end of the shoal; a fog signal is at the light. Due to protective riprap, the light should not be passed close aboard, even by shallow-draft vessels.

(848) **Charts 14902, 14903, 14910.–Kewaunee, Wis.,** is a town and small-craft harbor at the mouth of **Kewaunee River,** about 102 miles N of Milwaukee Harbor and 25 miles S of the entrance to the Sturgeon Bay Ship Canal.

(849) **Kewaunee Pierhead Light** (44°27.5′N., 87°29.8′W.), 45 feet above the water, is shown from a white square tower on the outer end of the pier on the S side of the harbor entrance; a fog signal is at the light.

(850) **Channels.**–A dredged entrance channel leads from deep water in Lake Michigan NW to an outer harbor basin protected by a breakwater on the NE side and a pier on the S side. The outer ends of the breakwater and pier are marked by lights. From the outer basin, the channel leads between piers at the mouth of Kewaunee River to a turning basin inside the mouth, thence N inside the shoreline to the N harbor basin. The outer end of the pier on the N side of the river mouth is marked by a light.

(851) In September 1998, the controlling depths were 16 feet in the approach channel to the outer harbor basin, thence 10 to 15 feet in the middle of the outer harbor basin, thence 14 feet to the turning basin, depths of about 20 feet were in the E half and 5 to 12 feet were in the W half of the turning basin, thence 16 feet in the channel to the N basin, with 18 to 20 feet in the N basin. The depths in the N part of the outer harbor decreases appreciably from the depth in the outer harbor basin at the S end.

(852) The outer basin is not adapted for anchorage, but reduces wave action in the inner harbor. Mooring to the breakwater or piers is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(853) Currents in the river attain velocities up to 3 mph.

(854) Above the turning basin, the Kewaunee River is navigable for about 6.5 miles by craft drawing not more than 4 feet.

(855) **Caution.**–Kewaunee Shoal and a shoal with a least depth of 15 feet that extends 0.5 mile E from the outer end of the breakwater should be avoided in approaching the harbor.

(856) **Bridges.**–A bascule highway bridge with a clearance of 9 feet crosses Kewaunee River about 0.3 mile above the mouth. Overhead power cables just below the bridge and 0.2 mile above the bridge have clearances of 46 and 28 feet, respectively. A Green Bay and Western Railroad bridge 1.5 miles above the river mouth has a swing span with two 30-foot openings and a clearance of 5 feet. (See **33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.)

(857) **Harbor regulations.**–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

(858) Local harbor regulations have been established by the city of Kewaunee and are enforced by a **harbormaster,** usually found at the city launch ramps, and by the police department. A **speed limit** of 5 mph (4.3 knots) is enforced in the harbor. Copies of regulations can be had from the City Clerk, 413 Milwaukee Street, Kewaunee, Wis. 54216.

(859) **Small-craft facilities.**–Transient berths, electricity, gasoline, diesel fuel, sewage pump-out, and engine repairs are available at the city dock on the W side of the turning basin. Another facility on the N side of the turning basin has additional berthage and the availability of hull repairs. In 1978, depths of 6 feet were reported alongside. City launching ramps are on the N side of the river 600 feet NW of Park Street bridge.

(860) **Ferries.**–Ferries that carry passengers, autos, and railroad cars operate from the NE side of the turning basin to Frankfort and Ludington, Mich.

(861) From Kewaunee N for 11 miles to Algoma the shore is low bluffs decreasing in height at the N end of the reach. Shoals extend about 0.8 mile offshore. Boulders covered 11 to 12 feet are near the outer edge of the bank just N of Kewaunee. Detached 11- and 12-foot spots are from 0.2 to 0.5 mile S of the entrance to Algoma harbor.

(862) **Algoma, Wis.,** is a town and small-craft harbor at the mouth of the **Ahnapee River,** about 112 miles N of Milwaukee Harbor and 14 miles SSW of the entrance to the Sturgeon Bay Ship Canal. The harbor is used mainly by local fish tugs and recreational craft.

(863) **Prominent features.**–Prominent are a silver tank 1 mile W of the harbor entrance, three black stacks 0.9 mile NW of the entrance, and a gray spire 0.4 mile N of the entrance.

(864) **Algoma Light** (44°36.4′N., 87°25.8′W.), 48 feet above the water, is shown from a red cylindrical tower on the outer end of the pier on the N side of the entrance channel; a fog signal is at the light.

(865) **Channels.**–A dredged entrance channel leads from deep water in Lake Michigan between a N pier with a detached outer section and a S breakwater to an outer harbor basin, thence through the mouth of Ahnapee River upstream for 0.2 mile to the Second Street bridge. The outer ends of the breakwater, the detached pier, and the main pier section are marked by lights. In September 1998, the controlling depth was 3 feet (7 feet at midchannel) to the Second Street bridge. In May 1985, the outer basin, SW of the channel, had depths of 7 feet decreasing to 2½ feet at the SW limit.

(866) The river channel bottom is rock and should be navigated with caution. Above the dredged channel, depths of about 3 feet can be carried for about 2 miles. The bottom in this reach is also rock.

(867) The outer basin is not adapted for anchorage, and mooring to the breakwater or piers is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(868) Currents in the river attain velocities up to 3 mph.

(869) **Bridges.**–Second Street bridge, about 0.2 mile above the mouth of Ahnapee River, has a fixed span with a clearance of 11 feet. Fourth Street bridge, 0.4 mile above the river mouth, has a 42-foot fixed span with a clearance of 11 feet. Overhead cables just below and about 0.2 mile above the Fourth Street bridge have unknown clearances. An overhead power cable about 300 feet above the bridge has a clearance of 39 feet.

(870) **Harbor regulations.**–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) Local harbor regulations have been established by the city of Algoma, and are enforced by a Water Safety Patrol. Copies of regulations may be obtained from the Chief of the Water Safety Patrol.

(871) **Small-craft facilities.**–A marina on the NE side of the river just above the mouth provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and marine supplies. Hoists to 40 tons are available for complete hull, engine, and electronic repairs. In 1978, the reported controlling depth was 8 feet alongside the fuel dock.

(872) From Algoma NNE for 14 miles to the entrance to the Sturgeon Bay Ship Canal, the shore is wooded and hilly, becoming lower in the N 4 miles. The shoal border varies in width from 0.5 to 1.3 miles. A buoy 2.2 miles S of the canal entrance marks the outer edge of the shoals.

(873) **Charts 14902, 14910, 14919.–Sturgeon Bay Ship Canal** provides a navigable connection between Lake Michigan and the S end of Green Bay. A canal has been cut from Lake Michigan across a narrow strip of land to the head of **Sturgeon Bay,** and thence a dredged channel leads through Sturgeon Bay to Green Bay. The Lake Michigan entrance to the canal is about 126 miles N of Milwaukee Harbor, across the lake W of Frankfort, Mich.

(874) **Sturgeon Bay Ship Canal Light** (44°47.7′N., 87°18.8′W.), 107 feet above the water, is shown from a white cylindrical tower on the N side of the canal entrance.

(875) **Channels.**–The dredged channel from Lake Michigan to Green Bay is about 8.6 miles long. The channel leads NW from deep water in Lake Michigan through detached piers and converging breakwaters, thence through a revetted canal to the SE end of Sturgeon Bay and thence through Sturgeon Bay to the vicinity of Sherwood Point. A turning basin is on the SW side of the channel in the city of Sturgeon Bay. The outer ends of the piers are marked by lights, and the approach channel is marked by unlighted buoys 0.2 mile SE of the pierhead lights. A fog signal is at the N pierhead light. The dredged channels through the canal and Sturgeon Bay are well marked with lights, a lighted range, and lighted and unlighted buoys.

(876) In May-June 1997, the controlling depths were 14 feet (17 feet at midchannel) to the Michigan Street bridge with 20 feet in the turning basin, thence 18 feet (20 feet at midchannel) through Sturgeon Bay to Green Bay.

(877) Currents in the canal and bay attain velocities up to 7 mph in either direction.

(878) Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(879) The channels and basin are not adapted for anchorage of vessels; vessels entering the canal for shelter may moor at the W end of same.

(880) Sturgeon Bay is a natural branch of Green Bay, but the navigational aids that mark the channel through it are placed with respect to proceeding from Lake Michigan through the ship canal to Green Bay.

(881) **Dangers.**–A shoal with a least depth of 16 feet is 1.3 miles SE of the Lake Michigan entrance to the canal. A lighted buoy at the S end of the shoal marks the approach to the canal.

(882) A solid rock ledge, covered 10 feet, borders the SW side of the dredged approach channel. Vessels entering the canal should avoid courses which will carry them close to this ledge and should enter the dredged approach channel between the unlighted buoys at its outer end.

(883) **Bridges.**–An overhead power cable with a clearance of 140 feet crosses the canal 1.25 miles above the Lake Michigan entrance. Bay View (State Routes 42/57) bascule highway bridge, with a clearance of 42 feet, crosses the canal 3 miles above the entrance. Michigan Street bridge at Sturgeon Bay has a bascule span with a clearance of 14 feet. (See **33 CFR 117.1 through 117.59 and 117.1101,** chapter 2, for drawbridge regulations.)

(884) **Sturgeon Bay Canal Coast Guard Station** is on the N side of the Lake Michigan entrance.

(885) A **speed limit** of 5 mph (4.3 knots) is enforced in the Sturgeon Bay Ship Canal. (See **33 CFR 162.125 and 207.470,** chapter 2, for navigation regulations.)

(886) **Sturgeon Bay, Wis.,** is a city on the Sturgeon Bay Ship Canal midway between Lake Michigan and Green Bay. The city is an important repair center, having facilities for repairs to all types and sizes of craft.

(887) **Anchorages.**–Special anchorages are on the N side of the dredged channel at the Bayview Bridge and on the S side of the channel 0.8 mile W of the bridge. (See **33 CFR 110.1 and 110.78,** chapter 2, for limits and regulations.)

(888) **Towage.**–Tugs to 2,000 hp are available at Sturgeon Bay from Selvick Marine Towing Corporation. Arrangements are made through their dispatch office in Sturgeon Bay at 920-743-6016. Tugs are also available from Green Bay. (See Towage under Green Bay.) The tugs monitor VHF-FM channel 16.

(889) The Coast Guard maintains a **Marine Safety Detachment** office at Sturgeon Bay. (See appendix for address.)

(890) **Repairs.**–Bay Shipbuilding Corp. operates two graving docks and a floating drydock on the E side of Sturgeon Bay 0.7 mile N of the Michigan Street bridge. The largest graving dock is 1,150 feet long, 140 feet wide, and has 18 feet over the keel blocks. The floating drydock can handle vessels to 640 feet long, 68 feet wide, and 7,150 tons. The 604-foot drydock is sectional and can be split up to any combination of 60-foot lengths.

(891) **Small-craft facilities.**–A marina 0.5 mile SSE of the Michigan Street bridge provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. Four mobile hoists to 50 tons can handle 66-foot craft for complete hull, engine, and electronic repairs. In 1994, depths of 8 feet were reported alongside the marina docks.

(892) Just NW of the Michigan Street bridge, a narrow spit of land, the remains of a former railroad bridge, extends NE from shore to near the edge of the dredged channel. A buoy off the end of the spit marks the channel limit.

(893) **Dunlap Reef,** marked on the NE side by a light, is on the W side of the dredged channel from about 0.3 to 0.7 mile NW of

the Michigan Street bridge. The center of the reef bares. A buoy midlength of the E side of the reef marks the edge of the dredged channel. There is deep water to W of the reef, but only about 11 feet between the S end of the reef and the spit of land NW of the Michigan Street bridge.

(894) **Hills Point,** marked by a light, is on the W side of Sturgeon Bay 2.2 miles NW of the Michigan Street bridge. **Sturgeon Bay Entrance Leading Light,** on shore 0.8 mile NW of Hills Point, shows on the centerline of the entrance channel to Sturgeon Bay from Green Bay.

(895) **Sawyer Harbor** is a small shallow inlet on the W side just inside the mouth of Sturgeon Bay. A marina on the N side of the inlet provides transient berths, water, and electricity.

(896) **Sherwood Point** is the N point of the spit of land that extends N and E from shore to form the W side of the entrance to Sturgeon Bay. **Sherwood Point Light** (44°53.6′N., 87°26.0′W.), 61 feet above the water, is shown from a white square tower with an attached dwelling on the point. A lighted bell buoy 1 mile E of Sherwood Point Light, near the middle of the mouth of Sturgeon Bay, marks the entrance to the Sturgeon Bay Ship Canal.

(897) **Sherwood Point Shoal,** a detached shoal with a least depth of 11 feet, is marked on the N side by a lighted horn buoy 2 miles NW of Sherwood Point Light. The shoal is a hazard to vessels approaching Sturgeon Bay from S. A shoal bank with depths of 2 to 18 feet extends from shore SW of Sherwood Point to within 0.3 mile of the S side of Sherwood Point Shoal.

(898) **Chart 14902.**–From the SE entrance to the Sturgeon Bay Ship Canal, the W shore of Lake Michigan trends NNE for 38 miles to the N tip of Door Peninsula, which separates the S end of Green Bay from Lake Michigan. This stretch is composed of a series of points with small bays between. The offshore areas are interspersed with submerged net stakes. The shore is low, sloping, and wooded.

(899) **Charts 14902, 14910.–Whitefish Point** (44°52.5′N., 87°12.3′W.) is 7.7 miles NE of Sturgeon Bay Canal Light. A shoal with a least depth of 10 feet, marked at the outer end by a buoy, extends 1 mile SE from the point.

(900) **Whitefish Bay** is a bight between Whitefish Point and **Cave Point,** 4 miles NNE. From the Sturgeon Bay Ship Canal NNE to Cave Point, the shoal border varies in width from 0.3 to 1 mile. A detached rock ledge, covered 16 feet, is off the mouth of Whitefish Bay, 1.8 miles S of Cave Point.

(901) **Jacksonport, Wis.,** a small village 3.4 miles N of Cave Point, is used by only a few recreational craft. There is a launching ramp at the State park.

(902) A shoal with a least depth of 3 feet extends 1.8 miles SE from shore just N of Jacksonport and is marked at the outer end by a gong buoy. A detached bank with depths of 13 to 17 feet is about 1 mile offshore 3.7 miles NE of Jacksonport.

(903) **Charts 14902, 14909.–Baileys Harbor**, about 14 miles N of Whitefish Point, is a small bay protected on the E by a point that extends E, then S, from shore. Shoals that extend 1 mile S from the point are marked on the SW side by a buoy. A shoal with a least depth of 1 foot extends from shore on the W side of the harbor entrance. Shoals extend about 0.25 mile off the E shore of the harbor and 0.5 mile off the N and W shores. **Baileys Harbor Directional Light** (45°04.2′N., 87°07.2′W.), at the NW corner of the harbor, shows a higher intensity beam on **340°** which marks the best water into the harbor. Vessels approaching Baileys Harbor should keep 1.5 miles offshore until the white sector is visible. A lighted bell buoy 3 miles SSE of the light, in the white sector, marks the harbor entrance.

(904) Baileys Harbor is sheltered and affords good anchorage, but is subject to considerable surge during heavy seas. Vessels should not anchor nearer than 0.5 mile of the N shore of the harbor, as the water is shallow and the sea that sets in during S gales is only partially broken by the shoals outside. The best holding ground is on the E side of the harbor.

(905) A yacht club on the NE side of Baileys Harbor provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and a launching ramp. Emergency repairs are available.

(906) **Moonlight Bay** opens on the NE side of the point which forms the E side of Baileys Harbor. The bay has deep water to just inside the entrance and affords fairly good anchorage with protection from all but E to S winds.

(907) **Cana Island Light** (45°05.3′N., 87°02.8′W.), 83 feet above the water, is shown from a white conical tower on a small island connected to shore by a narrow neck 1.5 miles NE of Moonlight Bay. From the light N to North Bay, the shore is clear except for numerous submerged net stakes extending about 0.7 mile offshore. In 1995, a dangerous wreck was reported 2 miles NNE of Cana Island Light in about 45°06′52.7″N., 87°00′52.0″W.

(908) **North Bay,** 3 miles N of Cana Island Light, has a small area of deep water near its mouth and affords fair anchorage for small craft with protection from all but E winds. Entrance to the bay is constricted by shoals that extend off each entrance point. The shoals are marked at the ends by buoys. Vessels should take care to avoid abandoned net stakes in the entrance.

(909) From the point that encloses the E side of the North Bay, the shore extends N to Rowley Bay, enclosed on the E by a point on which is located Newport State Park. **Rowley Bay** affords only limited shelter, and the anchorage is not good. The N end of the bay is fouled by many rocky spots covered 2 to 14 feet.

(910) The approach to Rowley Bay is obstructed by numerous shoals. **Four Foot Shoal,** 3 miles long N and S, lies with its N end 1.4 miles S of the point which encloses the E side of the bay. A bank with numerous rocks awash is on the S end of the shoal, and the N end of the shoal has limiting depths of 2 to 6 feet. Buoys mark the SE and W sides of the shoal. A shoal with rocks awash near the inner end and a depth of 11 feet near the outer end extends 1.1 miles S from Newport State Park and is marked by a buoy at the outer end. A detached shoal, marked on the S side by a buoy, has 2- and 9-foot spots 1 mile SW of Newport State Park. A shoal with a least depth of 1 foot extends from shore W of the N end of Four Foot Shoal and is marked at the outer end by a buoy. Rowley Bay may be entered W of Four Foot Shoal, between it and the shore to W. This passage is obstructed by a detached 9-foot shoal W of the midpoint of Four Foot Shoal. The bay may also be entered N of Four Foot Shoal.

(911) **Sand Bay** is a small indentation on the W side of Rowley Bay 1.4 miles S of the head. Slips on the W side of the bay used by commercial fishermen are protected by breakwalls and provide shelter in all winds. The slips have depths of about 6 feet. A resort marina on the W side of the bay provides berths, electricity, gasoline, and sewage pump-out.

(912) The waters from Rowley Bay N to Porte des Morts Passage are rendered foul by an irregular bottom with shallow banks and detached spots. **Spider Island** is a heavily wooded island 0.6 mile SE of Newport State Park with very shallow spots between. A shoal with a least depth of 9 feet, marked on the S side by a buoy, is 0.7 mile SE of Spider Island. **Outer Shoal,** marked on the E side by a buoy, is the outermost part of the foul area and lies 2.

miles NE of Spider Island. A 4-foot spot is 0.5 mile W of the buoy, and detached spots covered 6 to 18 feet are within 1.3 miles SW of the buoy.

(913) Waverly Shoal and Nine Foot Shoal are on the NE and SE corners, respectively, of an offshore bank E of the N end of Door Peninsula and on the S side of Porte des Morts Passage. **Waverly Shoal,** with a least depth of 12 feet and marked on the NE end by a lighted bell buoy, is 5.2 miles N of Spider Island. **Nine Foot Shoal,** just S of Waverly Shoal, has a least depth of 4 feet and is marked on the E side by a buoy.

(914) The N shore of Door Peninsula is deep-to through Porte des Morts Passage into Green Bay.

(915) **Charts 14902, 14908, 14909, 14910.–Green Bay** is 118 miles long NE and SW, from the head of Big Bay de Noc to the mouth of Fox River, and has a maximum width of 23 miles. The bay is separated from Lake Michigan by two mainland peninsulas; **Garden Peninsula,** the N one, is 20 miles long, and **Door Peninsula,** the S one, is about 70 miles long. The entrance to Green Bay between the peninsulas is about 28 miles wide, but is so congested with islands and shoals that the passages between them have acquired the reputation of being dangerous. The main entrances are through Porte des Morts Passage, Rock Island Passage, St. Martin Island Passage, and Poverty Island Passage.

(916) **Charts 14902, 14909.–Porte des Morts Passage,** the S entrance to Green Bay, is known as **Deaths Door,** due to the numerous detached shoals which obstruct it and the strong currents which set in or out of the passage according to the wind direction. The shores are rockbound and almost certain destruction to vessels going aground. These conditions have been the cause of many vessel disasters. The passage is bordered on the N side by Plum Island and Pilot Island and on the S side by Waverly Shoal and Door Peninsula.

(917) The entrance to Porte des Morts Passage from Lake Michigan is marked by a **330**°30′ lighted range on the SW shore of Plum Island. The approach to the passage is marked by a lighted bell buoy on the range line 5.4 miles SSE of Plum Island.

(918) **Plum Island,** about 1 mile long and 0.7 mile wide, is about midway between Door Peninsula and Washington Island, the largest island in the entrance to Green Bay. Shoals extend about 0.3 mile off the W and E sides of the island. Detached 16- and 19-foot spots are about 0.6 mile E of the S end of the island. A shoal with a least depth of 1 foot extends N from the island and is marked on the E side by a lighted buoy 0.6 mile N of the island. The buoy can be passed close aboard on the E side, but a narrow ridge of 15- to 20-foot depths extends 0.4 mile N from the buoy. Anchorage on the E side of Plum Island, between it and Detroit Island, is safe and is occasionally used in E gales, but it is subject to considerable swell.

(919) **Pilot Island,** 1.7 miles SE of Plum Island, is on the NE side of the Lake Michigan entrance to Porte des Morts Passage. Shoals extend 0.3 mile SE and SW from the island. **Pilot Island Light** (45°17.1′N., 86°55.2′W.), 48 feet above the water, is shown from a square yellow tower, with a red roof, attached to a dwelling on the island.

(920) **Detroit Island,** 3.5 miles long, extends SE from the SW end of Washington Island. The NE side of the island is connected to the S side of Washington Island by a very shallow rocky bank. The width of this bank diminishes toward the SE end of Detroit Island, where the bank extends 0.5 mile SE and S.

(921) **Detroit Island Passage** leads between the SW end of Washington Island and Detroit Island on the NE and Plum Island on the SW. The passage is obstructed by several shoals off the SW side of Detroit Island. The most dangerous is a 3-foot spot marked on its SW side by a buoy near the middle of the passage. Vessels should not pass NE of the buoy without local knowledge. There is good water between the buoy and the shoals off Plum Island. A shoal bank with depths of 8 to 10 feet parallels the SW side of Detroit Island about 0.8 mile offshore.

(922) **Washington Island,** the largest in the entrance to Green Bay, is a wooded island about 5.5 miles square. The W and N shores of the island are bluff with deep water close-to. The NW point of the island is marked by a light. The E side of the island is bordered by a shoal bank with a greatest extent of 1.25 miles and depths of 9 to 12 feet at the outer edge. **Hog Island** is a small island on the widest part of the bank. A detached 9-foot spot is 0.6 mile SE of the SE point of the Washington Island.

(923) **Detroit Harbor** is a large, but shallow indentation in the S shore of Washington Island. The mouth of the harbor is protected by the N end of Detroit Island. A semicircular bight in the N end of Detroit Island forms a well protected area in the S part of the harbor. N of Detroit Island, the harbor has general depths of 7 to 10 feet and a rocky spot, covered 3 feet, near the center. Shallow-draft vessels with local knowledge may enter the harbor across the rocky bank which connects the NE side of Detroit Island to Washington Island. The main entrance to the harbor is W of Detroit Island. **Washington Island Coast Guard Station**, seasonally operated, is on the SW side of Detroit Harbor at the S end of Washington Island.

(924) **Channels.**–A dredged entrance channel leads N from deep water in Detroit Island Passage between Washington Island and the W side of Detroit Island for 0.7 mile to a turning basin in the SW corner of Detroit Harbor. In September 1997, the mid-channel controlling depth was 14 feet in the channel with 11 to 14 feet in the basin. A light with a fog signal marks the W side of the channel entrance, and a lighted and several unlighted buoys mark the channel and basin.

(925) **Small-craft facilities.**–Transient berths, gasoline, diesel fuel, water, ice, and electricity are available on the W side of the basin. A boatyard on the E side of Detroit Harbor provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and some marine supplies. An 8-ton mobile hoist and a 65-ton marine railway that can handle 65-foot craft are available for hull and engine repairs.

(926) **Ferry.**–An automobile and passenger ferry operates from the W side of the basin to Gills Rock and Northport, on the N end of Door Peninsula.

(927) **Figenscaus Harbor (West Harbor)** is a small shallow indentation in the W shore of Washington Island. Its shoal water and exposure to W and NW winds make it practically of no value for commercial purposes.

(928) **Washington Harbor** is a deep indentation in the N shore near the NW corner of Washington Island. The harbor has good water with bold shores, and although the bottom is ledge rock and poor holding ground for anchors, good protection is afforded from all but N winds.

(929) **Jackson Harbor** is a small shallow indentation in the NE corner of Washington Island. Immediately inside of the entrance, a small area about 250 feet by 200 feet in size has depths of 8 to 10 feet. A considerable part of the remainder of the harbor is from 7 to 4 feet deep.

(930) **Channels.**–A channel, marked on the W side by a light and on the E side by a buoy, leads from Green Bay across the bar at the mouth of the harbor to the deeper water inside. The buoy is not charted beause it is frequently shifted in position to mark the

best water. Local knowledge is advised. In September 1997, the controlling depth was 4½ feet (9½ feet at midchannel).

(931) Limited transient berths are available at Jackson Harbor.

(932) **Ferry.**–A passenger ferry operates from Jackson Harbor to Rock Island, just NE.

(933) **Rock Island** is a State park connected close NE of Washington Island by a shallow rocky bank. The W, N, and E sides of the island are bluff with deep water close-to. A light on the NW corner of the island marks the S side of Rock Island Passage. The light is obscured from **275°** to **020°** by the dense foliage on Rock Island. A ferry operates from the State park pier on the SW side of the island to Jackson Harbor.

(934) **Fish Island** is a small island on a rocky bank 2.2 miles SE of Rock Island. The bank extends about 0.8 mile N and S from the island. **Fisherman Shoal,** 1.5 miles SSW of Fish Island, is about 1.3 miles long NW and SE and has several spots awash. The SE end of the shoal is marked by a lighted bell buoy. Both Fish Island and Fisherman Shoal are hazards to vessels navigating Rock Island Passage. A deep channel is between these banks and Washington and Rock Islands.

(935) **Rock Island Passage,** the widest passage into Green Bay, leads between Fish Island and Rock Island on the S and St. Martin Island Shoals on the N.

(936) The **State boundary** between Wisconsin and Michigan passes through Rock Island Passage.

(937) **St. Martin Island** is a wooded and hilly island 4.5 miles NNE of Rock Island. The W, N, and E shores of the island are generally deep-to. A shoal with depths of 3 to 19 feet extends 1.4 miles S from the SE point of the island.

(938) **St. Martin Island Shoals** are detached spots from about 1.5 to 2.3 miles S of St. Martin Island. The shoalest spot, covered 7 feet, is 2 miles S of the island with an 8-foot spot close N. From the 7-foot spot, the shoal extends 0.4 mile SW with depths increasing to 20 feet and is marked at the outer end by a buoy. A detached 13-foot shoal 0.7 mile E of the 7-foot spot is marked on the SE side by a buoy.

(939) **St. Martin Island Light** (45°30.3′N., 86°45.5′W.), 84 feet above the water, is shown from a white hexagonal tower on the NE point of St. Martin Island and marks the W side of St. Martin Island Passage.

(940) **Gull Island** and **Little Gull Island** are on the N and S ends, respectively, of a shoal bank 1.7 miles E of the N end of St. Martin Island. Between the islands, the bank has depths of 2 to 3 feet. **Gravelly Island,** on the continuation of the bank N of Gull Island, is surrounded by very shallow water. A channel with a depth of about 17 feet leads E and W between Gull and Gravelly Islands. A buoy 0.6 mile SW of Gravelly Island marks the W side of the bank. **Gravelly Island Shoals** comprise three detached shoals N of the island; a 14-foot spot 0.4 mile N, a 13-foot spot 0.7 mile N, and an 18-foot spot 1.2 miles N. These shoals are a hazard to vessels transiting Poverty Island Passage.

(941) **St. Martin Island Passage** leads between Gravelly and the Gull Islands on the E and St. Martin Island on the W. A lighted bell buoy about 0.4 mile S of Little Gull Island marks the Lake Michigan entrance to the passage. From a point about 0.6 mile S of the buoy, the course through the passage is **319°**.

(942) **Poverty Island,** 2.6 miles ENE of Gull Island, is marked on the S end by an abandoned lighthouse. The W side of the island, fronting Poverty Island Passage, is deep-to. A shoal extends 0.4 mile E from the S end of the island, and a shoal bank connects the NE side of the island with Summer Island, 1 mile NE. A dangerous wreck was reported in 1995, 2.5 miles S of Poverty Island Light.

(943) **Poverty Island Shoal,** 1.8 miles NW of Poverty Island, extends 1 mile N and S and has a least depth of 13 feet.

(944) **Poverty Island Passage** leads between Poverty Island and Poverty Island Shoal on the NE and the Gull Islands, Gravelly Island, and Gravelly Island Shoals on the SW. In addition to Poverty Island Shoal and Gravelly Island Shoals, the passage is also obstructed by a detached 20-foot spot 1 mile NE of Gravelly Island. Vessels bound for Green Bay should pass about 0.75 miles S of Poverty Island and then shape their course to pass between Poverty Island Shoal and Gravelly Island Shoals. The passage should only be navigated by light-draft vessels.

(945) **Charts 14902, 14908, 14909.**–**Summer Island** and **Little Summer Island,** the northernmost islands in the mouth of Green Bay, are 2 miles S and 3 miles W, respectively, of **Point Detour,** the S tip of Garden Peninsula which encloses the N end of Green Bay. The islands are connected by a sandy and stony flat which also reaches NE to the mainland. There are numerous rocks awash in this area. Depths over the flat are 1 to 3 feet between the islands and 5 feet between the islands and the mainland except for a narrow 6-foot channel that closely follows the shore. This channel is obstructed by a 1-foot spot marked on the NW side by a buoy. Shoals extend 1 mile W from Little Summer Island. **Rocky Island** and several small bare spots are on this bank. **Little Summer Island Shoal,** with a least depth of 6 feet, is 1 mile SW of Little Summer Island. A shoal bank with depths of 10 to 19 feet connects the S end of Summer Island to Poverty Island. The deeper water is close to Poverty Island. Summer Island is marked on the NE side by a light.

(946) **Charts 14902, 14909.**–From Porte des Morts Passage, the W shore of Door Peninsula extends generally SSW for 34 miles to the mouth of Sturgeon Bay. **Hedgehog Harbor,** a deepwater bight at the N end of the peninsula, is enclosed on the E by **Table Bluff** and on the W by **Deathdoor Bluff.** The harbor is well sheltered from S winds. **Gills Rock, Wis.,** a small village on the SE side of the harbor, is the terminous for passenger and automobile ferries operating to Detroit Harbor and Rock Island. A detached 15-foot shoal is 0.3 mile N of Deathdoor Bluff.

(947) **Ellison Bluff,** 3.5 miles SSW of Deathdoor Bluff, encloses the W side of **Ellison Bay.** The bay opens to the NW and provides protection from S and E winds. Good holding ground is in the S part of the bay in depths of 15 to 40 feet. **Ellison Bay, Wis.,** is a village at the head of the bay. Berths, gasoline, water, ice, and launching ramps are available.

(948) From Ellison Bluff, the bluff shore extends 4.7 miles S to the head of Sister Bay. There is deep water close-to, except for a 15-foot shoal extending 0.5 mile from shore about 2.5 miles S of Ellison Bluff. **Sister Bay,** enclosed on the W by **Sister Bluffs,** provides good anchorage with protection from ENE to W winds, mud and sand bottom. **Sister Bay, Wis.,** a village at the head of the bay, has a marina which provides complete small-craft services. Craft to 38 feet can be hauled out for hull and engine repairs.

(949) The waters NW of the mouth of Sister Bay are obstructed by several shoals and small islands. **Sister Islands,** two small islands on a shallow bank, are 2.5 miles NNW of the head of Sister Bay. The bank, which extends 0.2 mile N and 0.6 mile S from the islands, is marked on the W side by a buoy. A detached shoal with least depths of 12 feet is 1.2 miles S of the Sister Islands. **Sister Shoals** comprise a group of detached shoals from 0.6 to 1.5 miles N of the W end of Sister Bluffs. The shoals, with a least depth of 1 foot at the N end, are marked on the W side by a buoy.

**Horseshoe Reefs,** 3 miles NW of Sister Bluffs, extend 2.6 miles NE and SW. These rocky reefs have a least depth of 1 foot and are marked on the SE side by a lighted buoy.

(950) **Eagle Harbor** is a bay extending 2 miles S into the shoreline between Sister Bluffs on the E and Eagle Bluff on the W. The harbor has deep water within 0.8 mile of its head, except for detached 16- and 17-foot spots in the center. The outer part of the harbor affords good anchorage with protection from all but N and NW winds. **Ephraim, Wis.,** a village on the SE side of the harbor, has small-craft facilities providing gasoline, diesel fuel, water, ice, and engine repairs.

(951) **Eagle Bluff,** forming the W side of the mouth of Eagle Harbor, is marked by a prominent observation tower. **Nicolet Bay (Shanty Bay)** is a small bight opening just W of the tower. **Eagle Bluff Light** marks the W side of the point that encloses the W side of Nicolet Bay. The light is obscured from **220°** to **030°** by trees. **Horseshoe Island,** off the mouth of Nicolet Bay, is marked on the SW side by a light.

(952) From Eagle Bluff Light, the shore is bluff for 2.7 miles S to Fish Creek. The **Strawberry Islands** are a group of four small islands on a shoal bank which parallels this stretch about 1 mile offshore, from about 2.5 miles SW to 1 mile NW of Eagle Bluff Light. The SW edge of the shoal bank is marked by a buoy. **Strawberry Channel,** leading between the island group and the mainland, is marked on the E by Eagle Bluff Light and on the W by a lighted bell buoy and a buoy which mark the SE and NE edges of the shoal bank, respectively. The narrowest part of the channel, abreast the lighted bell buoy, has a depth of 13 feet. The buoy should be passed close aboard to avoid a shoal that extends from the shore.

(953) **Chambers Island,** 3.5 miles W of the Strawberry Islands, is in the middle of Green Bay. Shoals that extend about 1.9 miles N from the NE point of the island are marked on the outer end by a lighted bell buoy. A shoal with depths of 12 to 16 feet that extends 1.4 miles W from W side of the island is marked at the outer end by a lighted bell buoy. Shoals extend 0.7 mile off the SW shore of the island and 1.5 miles off the E shore. An 8-foot spot is on the outer edge of the shoals off the E shore. **Hanover Shoal,** with depths of 1 to 5 feet, extends 2 miles SE from the SE point of the island and is marked at the outer end by a buoy. Strangers should not attempt passage between Hanover Shoal and the Strawberry Islands. **Chambers Island Light** (45°12.1′N., 87°21.9′W.), 97 feet above the water, is shown from a skeleton tower with a black and white diamond-shaped daymark on the NW side of the island. The light is a guide to the passage between the island and the W shore of Green Bay.

(954) **Fish Creek, Wis.,** is a village on the SW side of **Fish Creek Harbor** 2.7 miles S of Eagle Bluff Light. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and hull and engine repairs are available. A **special anchorage** is in the bight. (See **110.79c,** chapter 2, for limits and regulations.)

(955) From Fish Creek Harbor S for about 6 miles to Egg Harbor the shore is bluff and deep-to. **Hat Island** is 2.8 miles offshore at about the middle of this stretch. Shoals extend 0.4 mile SE from the island. A detached 14-foot shoal is 1.3 miles NE of the island, and a rock awash, marked on the E side by a buoy, is 0.7 mile S.

(956) **Egg Harbor,** 8 miles S of Eagle Bluff Light, is a deep indentation open to the NW. The harbor affords good anchorage with protection from all but NW to N winds, mud bottom. **Egg Harbor, Wis.,** a village on the SE side of the bay, has a public dock with transient berths, electricity, gasoline, sewage pump-out, and a launching ramp.

(957) **Charts 14902, 14909, 14910.**–From Egg Harbor, the shore is deep-to for 1.5 miles SW to **Leroys Point.** From Leroys Point for the stretch of 5 miles SW, to a point 3 miles SW of **Horseshoe Point,** the shore is bordered by shoals and numerous detached spots with depths of 6 to 10 feet within 1 mile of shore. **Monument Shoal,** near the S end of this stretch, is marked on the W side by a buoy. A 7-foot shoal is 1 mile S of the buoy. The shore in this stretch should be given a berth of 2 miles.

(958) **Charts 14902, 14910, 14918, 14919.**–The shore from Monument Shoal SSW for 6 miles to the mouth of Sturgeon Bay is clear except for a 17-foot spot 0.6 mile offshore 3 miles N of the bay.

(959) **Sturgeon Bay** (described with the Sturgeon Bay Ship Canal) extends about 8 miles SE from Green Bay.

(960) **Caution.**–Aids to navigation in Sturgeon Bay have been placed with respect to traversing the bay from Lake Michigan through the Sturgeon Bay Ship Canal to Green Bay.

(961) **Sherwood Point Light** (44°53.6′N., 87°26.0′W.), 61 feet above the water, is shown from a white square tower with attached dwelling on the SW side of the entrance to Sturgeon Bay.

(962) From Sherwood Point Light the shore trends SW for 4 miles to a narrow peninsula that extends 1.2 miles NW from shore. **Snake Island** is close off the end of the peninsula. From the NE side of the peninsula and Snake Island, a shoal bank with depths of 2 to 18 feet extends 3.5 miles NNE. **Sherwood Point Shoal,** a detached 11-foot shoal marked on the N side by a lighted buoy, is off the N end of this shoal bank and 1.9 miles NNW of Sherwood Point. These shoals are a hazard to vessels navigating between Sturgeon Bay and the S end of Green Bay and should be given a wide berth.

(963) **High-Cliff Park** is a small privately maintained artificial harbor 1.5 miles SW of Sherwood Point Light. The W side of the harbor entrance is protected by a breakwater. In 1978, the reported controlling depths were 4 feet in the entrance channel and harbor. Due to obstructions in the entrance, the harbor should not be entered without local knowledge.

(964) A small bay on the S side of Snake Island has depths of 15 feet or more in the center and shoals toward shore. A privately dredged canal cuts across the W point of the bay to Little Sturgeon Bay.

(965) **Little Sturgeon Bay** opens to the N about 6 miles SW of the mouth of Sturgeon Bay. The bay has central depths of 7 to 15 feet with shoals along the shores. In September 1987, severe shoaling was reported to exist on the NW side of the bay in about 44°50′38″W., 87°33′04″W. An inn on the W side of the bay has transient berths with water and electricity.

(966) From Little Sturgeon Bay SW for about 7 miles, the shore is generally deep-to, thence for 16 miles SW to the village of **Red Banks, Wis.,** the shoal border is 0.25 to 1 mile wide. A detached 10-foot shoal is 1.5 miles offshore 3.5 miles N of Red Banks. The S end of Green Bay, from Red Banks to the mouth of Fox River, has depths of 18 feet and less. From **Point Sable** (44°34.7′N., 87°54.7′W.), 3 miles SW of Red Banks, **Frying Pan Shoal,** with 1-foot depths and spots awash extends W across the Bay to Long Tail Point. A dredged deep-draft channel leads through the shoals at the S end of Green Bay to the mouth of Fox River.

(967) **Charts 14910, 14916, 14918.–Green Bay Harbor,** at the mouth of **Fox River** at the S end of Green Bay, serves the cities of **Green Bay, Wis.,** and **De Pere, Wis.** The major commodities handled at the port are coal, limestone, wood pulp, cement, aggregates, and agricultural products.

(968) **Prominent features.**–The most prominent objects in the approach to Green Bay are a tank 4 miles ESE of the mouth of Fox River, a lighted stack 1.1 miles S of the river mouth, a stack 2.1 miles NW of the river mouth, and a tank 3.5 miles NW of the river mouth at the town of Howard.

(969) **Green Bay Harbor Entrance Light** (44°39.2′N., 87°54.1′W.), 72 feet above the water, is shown from a white conical tower on a cylindrical base on the W side of the entrance channel 9.3 miles NE of the mouth of Fox River. A fog signal is at the light.

(970) **Channels.**–The dredged entrance channel leads generally SW through the shallow water in the S end of Green Bay for about 11.5 miles to the mouth of Fox River and thence upstream for about 7.2 miles to a turning basin at De Pere. Other turning basins are on the E side of the channel 1.4 miles above the mouth at the mouth of East River and on the W side of the channel 3.6 miles above the mouth just above the Chicago & North Western Railway bridge. The entrance channel is well marked by lighted ranges, lights, and lighted and unlighted buoys. The river channel is marked by buoys from the second turning basin to the turning basin at De Pere.

(971) In July 1997, the controlling depths were 17 feet (21 feet at midchannel) to the East River turning basin (except for severe shoaling in the N half of the channel, about 125 feet into the channel, at Long Tail Point), thence 22 feet in the W half of the basin except for lesser depths to 19 feet near the edge, and 14 to 20 feet in the E half of the basin, thence 22 feet (23 feet at midchannel) to the railroad swing bridge 0.3 mile above Mason Street bridge, thence 21 feet to the turning basin just above the Chicago and North Western Railway bridge except for a 17-foot spot in the E draw of the swing bridge, thence 20 feet in the basin; thence in April-December 1993, 5 feet (5½ feet at midchannel) to the De Pere turning basin 8 to 13 feet in NE half and shoaling to less than 1 foot in the SW half of the basin. **Mariners are advised to contact the Port Director, Port of Green Bay, for the latest controlling depths.**

(972) **East River** empties into the E side of Fox River 1.3 miles above the mouth. The river is navigable to Baird Street bridge, 1.3 miles above the mouth. A depth of about 5 feet can be carried through the narrow and tortuous channel.

(973) **Caution.–Grassy Island,** on the E side of the entrance channel 4 miles NE of the Fox River mouth, and **Cat Island,** on the W side of the channel opposite, partially cover during periodic high-water conditions. Grassy Island is marked on the NW end by a light.

(974) In the approaches to Fox River, outside the limits of the dredged channel, numerous uncharted fish nets and stakes make navigation hazardous, particularly for strangers.

(975) A crescent-shaped spoil area is about 1 mile E of the mouth of Fox River.

(976) **Fluctuations of water level.**–Changes in wind direction or barometric pressure occasionally cause temporary water level fluctuations of up to 2½ feet above or below the prevailing mean lake level.

(977) **Currents.**–Currents in Fox River attain velocities to 3 mph and may run in either direction.

(978) **Weather, Green Bay and vicinity.**–Green Bay Wisconsin, is located in the eastern portion of the state at the head or southwest end of Green Bay. The Bay is oriented northeast-southwest and is separated from Lake Michigan to the southeast by the Door Peninsula. The location averages about seven days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 81°F (27.2°C) and an average minimum of 59°F (15°C). January is the coolest month with an average high of 23°F (-5°C) and an average minimum of 7°F (-13.9°C). The highest temperature on record for Green Bay is 103°F (39.4°C) recorded in July 1995 and the lowest temperature on record is -31°F (-35°C) recorded in January 1951. About 163 days each year experience temperatures below 32°F (0°C) and an average 38 days each year records temperatures below 5°F (-15°C). Every month has seen temperatures at or below 40°F (4.4°C) and every month except July and August has recorded temperatures at or below freezing (0°C).

(979) The average annual precipitation for Green Bay is 28.49 inches (724 mm). An annual maximum occurs during the summer, due mainly to convective activity, and a marked dry period occurs during the winter months. Precipitation falls on about 189 days each year. The wettest month is July with 3.45 inches (88 mm) and the driest, February, averages only 1.02 inches (25.9 mm). An average of 33 thunderstorm days occur each year with June, July and August being the most likely months. Snow falls on about 80 days each year and averages about 47 inches (1194 mm) each year. December and January each average about 11 inches (279 mm) per year. Ten-inch (254 mm) snowfalls in a 24-hour period have occurred in each month November, December, March and April. About ten days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June, July, and August. Fog is present on average 129 days each year and is rather evenly distributed throughout the year with a slight maximum during the late summer season.

(980) The prevailing wind direction in Green Bay is the southwest. Winter through early spring is the windiest period and a maximum gust of 70 knots occurred in May 1989.

(981) (See page T-13 for **Green Bay Climatological table.**)

(982) **Towage.**–Tugs to 1,200 hp are available at Green Bay. Arrangements are made through Selvick Marine Towing Corporation's dispatch office in Sturgeon Bay at 414-743-6016 or Great Lakes Towing Company's dispatch office in Cleveland at 800-321-3663.

(983) **Green Bay Coast Guard Station,** seasonally operated, is on the E side of the mouth of Fox River.

(984) Green Bay is a **customs port of entry.**

(985) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(986) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) RABIC CP6A300

(987) **Harbor regulations.**–Local harbor regulations are established by the City of Green Bay and enforced by the Port Director who can be reached at the Brown County Board of Harbor Commissioners, The Port of Green Bay, Wisconsin, Courthouse, Green Bay, Wis. 54301. Copies of the regulations can be obtained from the Port Director. A 4 mph (3.5 knots) **speed limit** is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

(988) **Local bridge regulations.**–Section 1. (a) Except on Sundays and legal holidays, the draws of bridges will not be required to open from 7:00 a.m. to 8:00 a.m., from 12:00 noon to 1:00 p.m., and from 4:00 p.m. to 5:00 p.m.: Provided, that the draw shall be opened promptly at all times for the passage of vessels carrying United States mails, vessels belonging to the United States, vessels of 300 short tons or over cargo capacity engaged in commer-

## Structures across Fox River below De Pere and East River
### *Miles above the mouth of Fox River
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| | **Fox River** | | | | | | | |
| 1 | Overhead cable | Power | 0.08 | | | | 155 | |
| 2 | Tower Drive bridge | Highway | 0.41 | | | 402 | 120 | Fixed. Note 1. |
| 3 | Overhead cable | Power | 0.45 | | | | 159 | |
| 4 | Green Bay & Western RR and Chicago & North Western Ry. bridge | Railroad | 1.03 | 85 | 85 | | 7 | Swing. Note 2. |
| | Junction with East River | | 1.21 | | | | | |
| 5 | Main St. bridge | Highway | 1.58 | | | 87 | 12 | Bascule. Note 3. |
| 6 | Walnut St. bridge | Highway | 1.81 | | | 124 | 11 | Bascule. Note 3. |
| 7 | Overhead cable | Power | 2.02 | | | | 153 | |
| 8 | Tilleman Memorial Bridge | Highway | 2.27 | | | 124 | 32 | Bascule. Note 3. |
| 9 | Wisconsin Central | Railroad | 2.61 | 75 | 75 | | 8 | Swing. Note 2. |
| 10 | Fox River Valley RR bridge | Railroad | 3.31 | 75 | 75 | | 31 | Swing. Note 2. |
| 11 | Allouez and Ashwaubenon bridge | Highway | 5.02 | | | 150 | 60 | Fixed. |
| | **East River** | | | | | | | |
| 12 | Overhead cable | Power | 1.41 | | | | 66 | |
| 13 | Monroe Ave. bridge | Highway | 1.56 | | | 60 | 13 | Fixed. |
| 14 | Green Bay & Western RR bridge | Railroad | 1.60 | 60 | 60 | | 6 | Swing. Note 4. |
| 15 | Overhead cable | Power | 1.72 | | | | 61 | |
| 16 | Webster Ave. bridge | Highway | 1.92 | | | 41 | 10 | Fixed. |
| 17 | Green Bay & Western RR bridge | Railroad | 2.21 | 60 | | | 7 | Swing. Note 4. |
| 18 | Main St. bridge | Highway | 2.28 | | | 60 | 7 | Fixed. |
| 19 | Baird St. bridge | Highway | 2.66 | | 40 | | 10 | Fixed. |
| 20 | Overhead cable | Power | 3.31 | | | | | Data not available. |
| 21 | Mason St. bridge | Highway | 3.52 | | | | 9 | Fixed. |
| 22 | Overhead cable | Power | 3.64 | | | | | Data not available. |
| 23 | Overhead cable | Power | 4.71 | | | | | Data not available. |
| 24 | Fox River Valley RR bridge | Railroad | 4.72 | | | | 13 | Fixed. |

Note 1.—Vertical clearance at center of span.
Note 2.—See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.
Note 3.—See **33 CFR 117.1 through 117.59 and 117.1087**, chapter 2, for drawbridge regulations.
Note 4.—Reported removed 1996.

cial transportation and their attendant towing tugs, and tugs or fireboats when responding to emergency calls.

(989) Sec. 2. No vessel, craft, or float shall approach or pass through any such bridge at a greater speed than 5 miles per hour.

(990) **Wharves.**–Green Bay has numerous docks and wharves on both sides of the Fox River. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) Most of the facilities described have rail and highway connections. Water and electrical shore-power connections are available at several docks.

(991) **Facilities on the W side of Fox River:**

(992) **Wisconsin Public Service Corp., Pulliam Power Plant Slip:** N side of the slip 0.2 mile above the river mouth; 480 feet of berthing space between breasting dolphins; 19 feet alongside; deck height, 6½ feet; open storage for 600,000 tons of coal; receipt of coal; bunkering of vessels; owned and operated by Wisconsin Public Service Corp.

(993) **Koch Fuels, North Dock:** outer part of the N side of the slip 0.3 mile above the river mouth; 355-foot face; 18 feet alongside; deck height, 5 feet; pipeline extends to tank storage for 40,000 barrels; receipt of petroleum products; owned by F. Hurlbut Co. and operated by Koch Fuels, Inc.

(994) **Hurlbut North Dock:** center part of the N side of the slip 0.3 mile above the river mouth; 745-foot face; 18 feet alongside; deck height, 5 feet; open storage for 50,000 tons of sand and limestone; receipt of limestone, sand, salt, coal, and petroleum coke; owned and operated by F. Hurlbut Co.

(995) **Hurlbut South Docks:** two sections on S side of the slip 0.3 mile above the river mouth; 200- and 500-foot faces; 19 feet alongside; deck height, 5 feet; open storage for 200,000 tons of

material; receipt of limestone, aggregate, salt, and coal; owned and operated by F. Hurlbut Co.

(996) **Koch Fuels, South Dock:** center part of the S side of the slip 0.3 mile above the river mouth; 425-foot face; 19 feet alongside; deck height, 5 feet; tank storage for 55,000 barrels of asphalt and 55,000 barrels of bunker C; receipt of asphalt and bunker C; owned by F. Hurlbut Co. and operated by Koch Fuels, Inc.

(997) **Hurlbut Salt Dock:** outer end of the S side of the slip 0.3 mile above the river mouth; 150-foot face, natural bank; 19 feet alongside; deck height, 4 feet; open storage for 100,000 tons of salt; receipt of salt; owned and operated by F. Hurlbut Co.

(998) **Amoco Oil Co. Dock:** 0.8 mile above the river mouth; 355-foot face; 19 to 21 feet alongside; deck height, 5 feet; tank storage for 737,000 barrels; receipt and shipment of petroleum products; owned and operated by Standard Oil Division of Amoco Oil Co.

(999) **Anamax Corp. Wharf:** 0.2 mile above Amoco Oil Co. Dock; 241-foot face; 23 feet alongside; deck height, 5 feet; tank storage for about 6,000 tons of tallow; shipment of liquid tallow; owned and operated by Anamax Corp.

(1000) **Western Lime and Cement Co. Wharf:** 0.25 mile above Anamax Corp. Wharf; 450-foot face; 23 feet alongside; deck height, 4 to 5 feet; open storage for 105,000 tons of limestone; receipt of limestone; owned and operated by Western Lime and Cement Co.

(1001) **Leicht Transfer and Storage Co., North Dock No. 1:** immediately above Western Lime and Cement Co. Wharf; 500-foot face; 22 to 25 feet alongside; deck height, 8 feet; cranes to 30 tons; 43,000 square feet covered storage; 30,000 square feet open storage; receipt and shipment of general cargo; owned and operated by Leicht Transfer and Storage Co.

(1002) **Leicht Transfer and Storage Co., North Dock No. 2:** immediately above Leicht Transfer and Storage Co., North Dock No. 1; 961 feet of berthing space; 24 to 28 feet alongside; deck height, 8 feet; cranes to 30 tons; 105,000 square feet covered storage; 52,000 square feet open storage; receipt and shipment of general cargo, pig iron, and miscellaneous bulk materials; owned and operated by Leicht Transfer and Storage Co.

(1003) **Fort Howard Paper Co., Northern Coal Dock:** 0.3 mile above Walnut Street bridge; 503-foot face; 24 feet alongside; deck height, 5 feet; open storage for 140,000 tons of material; receipt of salt and coal; owned and operated by Fort Howard Paper Co.

(1004) **The C. Reiss Coal Co. Wharf:** immediately above Tilleman Memorial (Mason Street) Bridge; 1,592-foot face; 18 to 23 feet alongside; deck height, 7 feet; open storage for 580,000 tons of coal; bridge crane with unloading rate 700 tons per hour; receipt of coal, pig iron, salt, and miscellaneous bulk materials; coal and oil bunkering; owned and operated by C. Reiss Coal Co.

(1005) **LaFarge Corporation Terminal:** N side of the slip 0.65 mile above Tilleman Memorial Bridge; 426 feet of berthing space with dolphins; 19 feet alongside; deck height 8½ feet; storage silos for 15,000 tons of cement; receipt of bulk cement; owned and operated by Lafarge Corporation of Green Bay.

(1006) **Leicht Transfer and Storage Co., State Street Dock:** N side of the slip 0.2 mile above Lafarge Corporation Terminal; 540-foot face; 19 feet alongside; deck height, 6 feet; open storage for 40,000 tons of salt; receipt of wood pulp and salt; owned and operated by Leicht Transfer and Storage Co.

(1007) **Fort Howard Paper Co. Wharf:** S side of the slip 0.4 mile above the Lafarge Corporation Terminal; 1,100-foot face; 20 feet alongside; deck height, 7 feet; open storage for 450,000 tons of coal and salt; 110-ton derrick; receipt and shipment of heavy-lift items; receipt of coal, wood pulp, and salt; owned and operated by Fort Howard Paper Co.

(1008) **Facilities on the E side of Fox River:**

(1009) **James River Dock:** immediately below the mouth of East River; 1,027 feet of berthing space; 11 to 20 feet alongside; deck height, 6 feet; receipt of pulp wood; owned and operated by James River Co.

(1010) **U.S. Oil, Inc., Dock:** 0.3 mile above river mouth; 298 feet of berthing space with dolphins; 21 feet alongside; deck height, 8 feet; storage tanks for 488,000 barrels; receipt of petroleum products; owned and operated by U.S. Oil, Inc.

(1011) **Supplies.**–Limited marine supplies and adequate foodstuffs are available. Water is available upon arrangements at Anamax Corp. Wharf, Leicht Transfer and Supply Co., North Dock Nos. 1 and 2, Lafarge Corporation Terminal, and James River Dock. Bunker C and diesel oil are available by truck.

(1012) **Repairs.**–Marine radio and radar repairs are available at Green Bay.

(1013) **Small-craft facilities.**–Most of the facilities along the shores of Fox River offer all or some of the following services: transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, launching ramps, pumpout service, a lift and /or a marine railway. Demasting service is available on the E side of the river about 3 miles above the mouth.

(1014) **Communications.**–Green Bay has highway and rail connections. Passenger and freight air service is available at the airport W of the city.

(1015) **Chart 14916.–Fox River** rises above Berlin, Wis., and flows generally E, flowing through Lake Butte des Morts before emptying into the W side of **Lake Winnebago** at Oshkosh, Wis. The lower Fox River flows from the N end of Lake Winnebago at Menasha, Wis., and flows generally NE for about 39 miles to Green Bay. Above De Pere, Wis., the lower Fox River has been improved as necessary to provide a 6-foot channel to Lake Winnebago.

(1016) **Caution.**–Mariners transiting the Fox River from De Pere to Menasha are cautioned to stay within the channel. Depths outside the channel are very shallow over bedrock. Vessels have suffered severe damage from slight departures from the channel. The river is marked by private buoys and they may be relocated without prior notice.

(1017) The rise from Low Water Datum at Green Bay to the level of Lake Winnebago is about 168.3 feet. This rise is accomplished by 17 locks and 2 guard locks. These locks have an available length of 144 feet, width of 35 feet, and depth of 6 feet over the sills at normal pool level. Lockage is provided from about May 15 to October 15, as determined by the District Engineer, U.S. Army Corps of Engineers. Under a lease agreement, the locks are operated by the State of Wisconsin, Fox River Management Commission. Information about specific operating hours and user fees can be obtained from the Fox River Management Commission, 1008 Augustine Street, Kaukauna, Wis. 54130 (telephone 414-766-9098) or the U.S. Army Corps of Engineers, Fox River Sub-Office (telephone 414-766-3531). (See **33 CFR 207.460(a)**, chapter 2, for lock regulations.)

(1018) High-water periods on the Fox River, with currents up to 3 to 5 mph, continue for about 2 months on the average, beginning the latter part of March and extending into May. The low-water periods on the river average about 40 days, beginning in July and extending into September.

## Structures across Fox River from De Pere to Lake Butte des Morts

***Miles above the mouth of the river***

****Clear width in feet proceeding upstream***

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Low | High | |
| | De Pere Lock | | 7.15 | | | | | | |
| 1 | Overhead cable | Power | 7.17 | | | | 69 | | |
| 2 | De Pere-George St. bridge | Highway | 7.27 | | | 75 | 24 | | Bascule. Note 1. |
| 3 | Overhead cable | Power | 12.67 | | | | 83 | | |
| 4 | Overhead cable | Power | 12.86 | | | | 85 | | |
| 5 | Overhead cable | Power | 13.10 | | | | 77 | | |
| | Little Kaukauna Lock | | 13.12 | | | | | | |
| 6 | Overhead cable | Power | 17.28 | | | | 80 | | |
| 7 | Wrightstown bridge | Highway | 17.36 | | | 70 | 16 | | Bascule. Note 3. |
| | Rapide Croche Lock | | 19.16 | | | | | | |
| 8 | Overhead cable | Power | 19.50 | | | | 86 | | |
| | Kaukauna Lock 5 | | 22.69 | | | | | | |
| | Kaukauna Lock 4 | | 23.04 | | | | | | |
| | Kaukauna Lock 3 | | 23.22 | | | | | | |
| 9 | Kaukauna-Fox River Valley RR bridge | Railroad | 23.34 | | 40 | | 14 | | Swing. Right draw not available. Note 3. |
| | Kaukauna Lock 2 | | 23.36 | | | | | | |
| 10 | Overhead cable | Power | 23.55 | | | | 80 | | |
| | Kaukauna Lock 1 | | 23.57 | | | | | | |
| 11 | Kaukauna-Wisconsin Ave. bridge | Highway | 23.78 | | | 90 | 7 | | Vertical lift. Clearance up 65 feet. Note 3. |
| 12 | Kaukauna-Lawe Ave. bridge | Highway | 23.89 | | | 90 | 23 | | Bascule. Note 3. |
| | Kaukauna Guard Lock | | 23.98 | | | | | | |
| | Combined Locks | | 25.40 | | | | | | |
| 13 | Overhead cable | Power | 25.47 | | | | 75 | | |
| 14 | Overhead cable | Power | 25.81 | | | | 70 | | |
| | Little Chute Lock 2 | | 26.34 | | | | | | |
| | Little Chute Guard Lock | | 26.53 | | | | | | |
| 15 | Little Chute-Mill St. bridge | Highway | 26.53 | | | 35 | 4 | | Bascule. Note 3. |
| 16 | Little Chute-Kimberly bridge | Highway | 26.70 | | | 143 | 54 | | Fixed. |
| 17 | Overhead cable | Power | 27.20 | | | | 82 | | |
| | Cedars Lock | | 27.32 | | | | | | |
| 18 | Overhead cable | Power | 27.91 | | | | 99 | | |
| 18A | Appleton-Tri-County Expressway | Highway | 28.06 | | | 100 | 54 | | Fixed. |
| 19 | Overhead cable | Power | 29.89 | | | | 85 | | |
| | Appleton Lock 4 | | 30.76 | | | | | | |
| 20 | Appleton-College Ave. bridge | Highway | 30.80 | | | | 54 | | Fixed. |
| 21 | Overhead cable | Power | 31.21 | | | | 73 | | |
| 22 | Appleton-Fox River Valley RR bridge | Railroad | 31.22 | 60 | 59 | | 4 | | Swing. Right draw not available. Note 3. |
| | Appleton Lock 3 | | 31.31 | | | | | | |
| 23 | Overhead cable | Power | 31.36 | | | | 67 | | |
| 24 | Appleton-Lawe St. bridge | Highway | 31.37 | | | 70 | 3 | | Bascule. Note 3. |
| | Appleton Lock 2 | | 31.60 | | | | | | |
| 25 | Appleton-Oneida St. bridge | Highway | 31.74 | | | 30 | 10 | | Bascule. Note 3. |
| 25A | Appleton-Oneida Skyline bridge | Highway | 31.85 | | | 70 | 54 | | Fixed. |
| | Appleton Lock 1 | | 31.96 | | | | | | |
| 26 | Overhead cable | Power | 32.01 | | | | 83 | | |
| 27 | Appleton-Memorial Dr. bridge | Highway | 32.36 | | | 132 | 54 | | Fixed. |
| 28 | Overhead cable | Power | 34.36 | | | | 64 | | |
| 29 | Overhead cables | Power | 34.56 | | | | 56 | | |

## Structures across Fox River from De Pere to Lake Butte des Morts (Continued)
### *Miles above the mouth of the river
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Low | High | |
| 30 | Little Lake Butte des Morts bridge | Highway | 35.94 | | | 217 | 54 | | Fixed. Navigation through E center span. |
| | Menasha Lock | | 37.05 | | | | | | |
| 31 | Overhead cables | Power & Television | 37.27 | | | | 64 | | |
| 32 | Menasha-Soo Line RR and Chicago, Milwaukee, St. Paul & Pacific RR bridge | Railroad | 37.28 | 60 | | | 3 | | Bascule. Note 3. |
| 33 | Menasha-Tayco St. bridge | Highway | 37.52 | | | 63 | 3 | | Bascule. Note 3 |
| 34 | Menasha-Racine St. bridge | Highway | 37.91 | | | 101 | 3 | | Bascule. Note 3. |
| 35 | Overhead cable | Power | 37.92 | | | | 60 | | |
| 36 | Oshkosh-Fox River Valley RR bridge | Railroad | 55.72 | 70 | 70 | | 6 | | Swing. Note 3. |
| 37 | Oshkosh-Main St. bridge | Highway | 55.97 | | | 89 | 11 | | Bascule. Note 2. |
| 38 | Oshkosh-Jackson St. bridge | Highway | 56.22 | | | 97 | 11 | | Bascule. Note 2. |
| 39 | Overhead cable | Power | 56.57 | | | | 72 | | |
| 40 | Oshkosh-Soo Line RR bridge | Railroad | 56.58 | 68 | 67 | | 5 | | Swing. Note 3. |
| 41 | Oshkosh-Wisconsin St. bridge | Highway | 56.72 | | | 75 | 12 | | Bascule. Note 2. |
| 42 | Overhead cable | Power | 57.24 | | | | 75 | | |
| 43 | Oshkosh-Congress Ave. bridge | Highway | 58.01 | | | 75 | 13 | | Bascule. Note 2 |
| 44 | Overhead cable | Power | 59.22 | | | | 78 | | |
| 45 | Oshkosh-U.S. Route 41 bridge | Highway | 59.24 | | | 76 | 31 | | Twin fixed. |

Note 1.–See **33 CFR 117.1 through 117.59 and 117.1087(b)**, chapter 2, for drawbridge regulations.
Note 2.–See **33 CFR 117.1 through 117.59 and 117.1087(c)**, chapter 2, for drawbridge regulations.
Note 3.–See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.

(1019) **Caution.**–During periods of moderate to high flow, mariners should be careful to avoid being drawn over the Menasha Dam by the hazardous outdraft.

(1020) **Drydock.**–A drydock basin is adjacent to the third lock at **Kaukauna, Wis.**, 23 miles above the mouth of Fox River. The drydock is owned by the U.S. Government, but is available for public use. It is fitted with wooden lock gates, and is filled by gravity through valves in the gates and emptied through a concrete culvert below the third lock. The drydock is 142 feet long with 132 feet on the keel blocks, has a width of 35 feet at the entrance, and has a depth of 6 feet over the sill. The widths inside the basin are 125 to 64 feet at the bottom and 173 to 91 feet at the top. (See **33 CFR 207.460(b)**, chapter 2, for drydock regulations.)

(1021) **Menasha, Wis.**, is on the N side of Fox River at the outlet from Lake Winnebago. The dredged channel in the river leads from the lake between Menasha and **Doty Island**, in the center of the lake outlet. Two highway bridges and a railroad bridge cross the river at Menasha.

(1022) **Menasha bridge regulations.**–Section 1. It shall be unlawful for any person, persons, firm, partnership, or corporation to operate a boat upon the Government Canal within the corporate limits of the city of Menasha in such manner as to require the opening of the Racine Street or Washington-Tayco Street drawbridges during the following hours: 12:00 midnight to 8:00 a.m.; 11:50 a.m. to 12:10 p.m.; 12:45 p.m. to 1:00 p.m. and 3:40 p.m. to 4:15 p.m.

(1023) Sec. 2. Any person, persons, firm, partnership, or corporation violating the provisions of section 1 shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not to exceed $25 or by imprisonment in the county jail not more than 30 days, or by both such fine and imprisonment.

(1024) Special anchorages are at **Neenah, Wis.** in the Fox River S of Doty Island at its confluence with Lake Winnebago. (See **33 CFR 110.1 and 110.79**, chapter 2, for limits and regulations.)

(1025) **Lake Winnebago** is about 28 miles long with a maximum width of about 10 miles and a greatest depth of 20 feet. The waters of the lake are contained by dams on either side of Doty Island and by a lock at Menasha. Lake levels are usually highest between April and June and lowest between December and February. **Chart Datum, Lake Winnebago.**–During the navigation season, water levels are regulated to stay within prescribed limits above Low Water Datum, 745.1 feet above Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955).

(1026) **Lighthouse Reef**, with rocks awash, is in the approach to the dredged river channel at Menasha.

## Structures across the Wolf River
### *Miles above the mouth of the river
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Standard low water | Extreme high water | |
| 1 | Overhead cable | Power | 2.18 | | | | 89 | 82 | |
| 2 | Overhead cable | Power | 2.37 | | | | 75 | 68 | |
| 3 | Winneconne bridge | Highway | 2.43 | | | 70 | 7 | 2 | Bascule. Note 1. |
| 4 | Overhead cable | Power | 20.93 | | | | 71 | 64 | |
| 5 | Overhead cable | Power | 22.38 | | | | 82 | 75 | |
| 6 | Fremont bridge | Highway | 22.43 | | | 161 | 20 | 12 | Fixed. |
| 7 | Overhead cable | Power | 22.44 | | | | 60 | 53 | |
| 8 | Overhead cable | Power | 27.70 | | | | 68 | 60 | |
| 9 | Gills Landing-Soo Line RR bridge | Railroad | 27.83 | 56 | 56 | | 9 | 0 | Notes 2 and 3. |
| 10 | Overhead cable | Power | 27.84 | | | | 47 | 38 | |
| 11 | Northport bridge | Highway | 42.70 | | | 96 | 15 | 5 | Fixed. |
| 12 | Overhead cable | Power | 42.72 | | | | 35 | 25 | |
| 13 | Overhead cable | Power | 42.74 | | | | 68 | 58 | |
| 14 | New London-Shawno St. bridge | Highway | 46.13 | | | 62 | 15 | 3 | Fixed. |
| 15 | Overhead cable | Power | 46.37 | | | | 67 | 55 | |
| 16 | New London-Pearl St. bridge | Highway | 46.43 | | | 100 | 15 | 3 | Fixed. |
| 17 | Overhead cable | Power | 46.63 | | | | 58 | 46 | |

Note 1.–See **CFR 117.1 through 117.59 and 117.1107,** chapter 2, for drawbridge regulations.
Note 2.–See **CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.
Note 3.–Advance notice of 24 hours is required for bridge opening; telephone, 715–344–1910.

(1027) **Caution.**–Extensive fish nets are placed in Lake Winnebago from April through June by the Wisconsin Department of Natural Resources. Information on the location of the nets may be obtained from Wisconsin Department of Natural Resources, Calumet Harbor Station, P.O. Box 374, Fond du Lac, Wis. 54935.

(1028) The N shore of the lake is wooded and of moderate height. **High Cliff State Park,** at the NE corner of the lake, has a small-craft basin. The entrance to the basin is protected by converging breakwaters. Transient berths and launching ramps are available.

(1029) **Stockbridge Harbor** and **Brothertown Harbor** are small harbors on the E side of Lake Winnebago, 10.5 and 17 miles SE of Menasha, respectively.

(1030) **Calumet Harbor** is on the SE side of the lake at the mouth of **Pipe Creek.** In 1978, the dredged entrance channel had a controlling depth of 4 feet except for shoaling along the channel edges. Transient berths, water, and launching ramps are available.

(1031) **Fond du Lac** is a small-craft harbor at the S end of Lake Winnebago at the mouth of **Fond du Lac River.** A tank 1.4 miles S of the river mouth is prominent.

(1032) **Channels.**–A dredged channel leads from Lake Winnebago to the mouth of Fond du Lac River and upstream for 0.6 mile. In 1978, the midchannel controlling depth was 3½ feet. Overhead cables crossing the channel about 0.5 mile above the mouth have a reported least clearance of 60 feet.

(1033) **Small-craft facilities.**–Transient berths, gasoline, water, electricity, and sewage pump-out facilities are available in the municipal basin 0.8 mile E of the river mouth. The entrance channel and basin have depths of 4 to 7 feet.

(1034) **Oshkosh, Wis.,** is on the W side of Lake Winnebago, 13 miles S of Menasha, at the mouth of the upper Fox River. A tank 0.3 mile SW of the river mouth and a tower 0.8 mile NE of the river mouth are prominent.

(1035) **Small-craft facilities.**–A marina protected by breakwaters just S of the mouth of Fox River provides transient berths, gasoline, diesel fuel, water, electricity, and a launching ramp. Sewage pump-out facilities, marine supplies, hoists, and hull and engine repairs are available at marinas on the S side of Fox River.

(1036) A **special anchorage** area is in the S part of **Miller Bay,** about 1.8 miles N of the mouth of Fox River.

(1037) From Lake Winnebago, the **Fox River** extends 3 miles NW to **Lake Butte des Morts.** This section of the river has depths of 12 feet or more at midchannel. A winding channel leads through Lake Butte des Morts, and thence Fox River extends SW from the SW side of the lake. The towns of **Omro, Wis., Eureka, Wis.,** and **Berlin, Wis.,** are about 4, 10, and 18 miles above the lake, respectively. In 1978, it was reported that depths of about 3 feet could be carried to Berlin.

(1038) Pools on the upper Fox River are maintained by water control structures at Fort Winnebago, Governor Bend, Montello,

Grand River, Princeton, White River, and Berlin. The locks at these locations have been removed; hand-operated haulovers are available at Montello, Grand River, Princeton, White River, Berlin, and Eureka to move small-craft between pools. A lock at Eureka is operated on weekends and holidays from May 25 through September 30

(1039) **Wolf River** flows from the N and joins Fox River at **Winneconne, Wis.,** at the NW end of Lake Butte des Morts. Wolf River has a project depth of 4 feet from the mouth upstream for about 47 miles to New London. The river banks rise 4 to 10 feet above the low-water surface; during flood stage the river rises 6 to 12 feet above the summer stage and during freshets the banks are generally overflowed.

(1040) **Charts.**–The E half of Lake Butte des Morts is covered by NOS Chart 14916. Coverage of the upper Fox River and the Wolf River above Lake Butte des Morts is on maps available from Fox River Marina, Inc., Oshkosh, Wis.

(1041) **Charts 14918, 14910.**–The head of Green Bay, from the mouth of Fox River N for about 3.5 miles to Long Tail Point on the W and Point au Sable on the E, is filled by a shallow expanse through which the entrance channel to the Fox River has been dredged.

(1042) **Long Tail Point,** a low ridge submerged in places, reaches SE about 3 miles from the shoreline just S of the mouth of Suamico River. **Dead Horse Bay,** on the SW side of Long Tail Point, has good anchorage for small craft in depths of 8 to 10 feet, sand and gravel bottom. A marina on the W side of the bay provides berths, electricity, gasoline, and sewage pump-out.

(1043) **Duck Creek,** flowing into Green Bay 1.5 miles NW of the mouth of Fox River, is navigable by small craft for 2.7 miles above the mouth. The creek has depths of 1 to 3 feet through marshy areas near the mouth, thence 3 feet in the creek.

(1044) **Suamico River** is a small stream flowing into Green Bay about 6 miles N of the mouth of Fox River.

(1045) **Channels.**–A dredged entrance channel leads from deep water in Green Bay to the mouth of the river and thence upstream for 0.3 mile. The entrance channel is marked by a light, lighted buoys, and a private unlighted buoy. In December 1993, the controlling depth was 7½ feet in the entrance and river channels except for 6½ feet near the S channel edge at the first bend, and along the edges of the channel inside the mouth of the river.

(1046) A submerged discharge structure, marked by a buoy, is on the S side of the bend at the entrance to the river. Caution should be exercised in the area.

(1047) A fixed highway bridge with a clearance of 10 feet crosses the river about 1.5 miles above the mouth.

(1048) From Suamico River N for 14 miles to Pensaukee, the shore is bordered by shoals extending about 3 miles off. Depths of 2 feet are as much as 1.7 miles off. **Little Tail Point,** 3 miles N of Suamico River, is a narrow ridge, nearly level with the water surface, that extends about 1.8 miles SE from shore. **Little Suamico River** is a small stream 5 miles N of Suamico River.

(1049) **Charts 14902, 14910.–Pensaukee Harbor** is at the mouth of **Pensaukee River,** on the W shore of Green Bay about 14 miles N of Suamico River.

(1050) **Channels.**–A dredged entrance channel leads from deep water in Green Bay to the mouth of the river. A lighted buoy marks the dredged channel, and a light marks the pier ruins on the N side of the entrance channel. In July 1997, the midchannel controlling depth was 4½ feet; mariners are advised to favor the S side of the channel at the mouth of the river, the N side shoals to bare.

(1051) The only facilities available at Pensaukee Harbor are for fish tugs which moor on the S side of the river mouth.

(1052) From Pensaukee Harbor NE for 6.5 miles to the mouth of Oconto River, shoals extend 3.8 miles from shore. **Pensaukee Shoal,** with depths of 1 to 4 feet, extends 3 miles SE from shore about 2 miles NE of Pensaukee Harbor. A wreck, covered 4 feet and marked on the E side by a buoy, is 4.2 miles ENE of the mouth of Pensaukee River. A shoal bank with depths of 1 to 5 feet extends 2.3 miles SE from shore just S of the mouth of Oconto River. **Oconto Shoal,** with a least depth of 11 feet, is a detached bank 3.6 miles SE of Oconto River mouth.

(1053) **Oconto Harbor** is at the mouth of **Oconto River,** on the W shore of Green Bay about 27 miles N of the mouth of Fox River. The city of **Oconto, Wis.,** is about 2 miles up the river. Below Oconto the river traverses an area of low, swampy ground, the elevation of which is only slightly above the surface of the river.

(1054) **Channels.**–A dredged entrance channel leads from deep water in Green Bay between two piers to a turning basin inside the mouth of the river. The outer ends of the N and S piers are marked by lights. A stub about midlength of the N pier juts out SE toward the channel; a buoy is near the outer end of the stub, marking the NW boundary of the channel. In September 1998, the midchannel controlling depth was 10 feet in the entrance channel to the piers, thence 9 feet in the SE 100-foot section of the wide harbor channel between the piers to near the stub (except for much lesser depths along the SE edge); the NW and middle sections of the wide harbor channel have controlling depths of 3½ feet. Just NE of the stub, the harbor channel decreases in width to the turning basin. In August-September 1998, the controlling depth was 8 feet (9 feet at midchannel) to the turning basin, thence in August 1998, 4 to 9 feet were in the middle of the basin; much lesser depths surround the spoil bank protruding into the head of the turning basin. The spoil bank is about 40 feet wide and extends about 400 feet from shore into the center of the W end of the turning basin. The N side of the turning basin has a channel width of about 100 feet between the dredge bank and the N channel line.

(1055) Inside the shoreward ends of the piers, the banks of the river are generally unprotected by revetments, and bars form in the wide portions of the channel from scour in the narrower parts during severe freshets. A depth of about 3 feet can be carried for 1 mile in the river with local knowledge.

(1056) A fixed highway bridge with a clearance of 9 feet crosses the river at Oconto.

(1057) **Small-craft facilities.**–Marinas on the N side of the river provide transient berths, gasoline, water, electricity, sewage pump-out, limited marine supplies, and launching ramps. A 15-ton hoist is available for hull and engine repairs.

(1058) From the mouth of Oconto River, the shore trends N for about 3 miles and then curves E for about 9 miles to the mouth of **Peshtigo River.** The shore in this stretch is low and wooded, and the broad bight between the mouths of the two rivers is shallow, with prevailing depths of 1 to 12 feet. A detached shoal with a least depth of 17 feet is 6.5 miles E of the mouth of Oconto River. The approach to Peshtigo River is marked by a lighted bell buoy 0.9 mile S of the mouth.

(1059) **Peshtigo Point** is a low marshy point just E of the mouth of Peshtigo River. **Peshtigo Reef,** with depths of 1 to 6 feet extends 3 miles SE from the point. **Peshtigo Reef Ligh** (44°57.4′N., 87°34.8′W.), 72 feet above the water, is shown from

white column with a red band at the outer end of the reef; a fog signal is at the light.

(1060) **Charts 14902, 14910, 14909.**–From Peshtigo Point N for 8 miles to Menominee River, the shore is bordered by a sandy ledge that extends 2 miles offshore. In the S part of the reach, depths on the ledge are 5 to 10 feet, but in the N part of the reach, **Menekaunee Shoal** uncovers and is marked on the outer edge by a buoy. A wreck, covered 2 feet, 0.4 mile SE of Menominee Pierhead Light, is a hazard to small craft.

(1061) A private light marks the S side of the mouth of **Little River,** about 3.3 SSW of the mouth of Menominee River.

(1062) **Green Island** is a wooded island 5 miles SE of the mouth of Menominee River. Shoals extend about 0.2 mile off the N and S shores. A shoal that extends 0.7 mile SE from the E end of the island is marked off the outer end by a buoy, and a shoal with depths of 3 to 11 feet that extends W from the island is marked at the outer end by a lighted buoy. The area surrounding Green Island should be avoided by deep-draft vessels, because it is foul with stones and waste discharged from dredging operations. **Green Island Light** (45°03.3′N., 87°29.5′W.), 80 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the SE end of the island. A dangerous wreck about 1.4 miles NNE of Green Island Light was reported in 1995.

(1063) **Charts 14909, 14917.–Marinette, Wis.,** on the S side, and **Menominee, Mich.,** on the N side, form a deep-draft harbor at the mouth of **Menominee River.** The harbor is on the W side of Green Bay, about 33 miles SW of Porte des Morts Passage and 17 miles NW of the Sturgeon Bay Ship Canal. Menominee River forms the **State boundary** between Wisconsin and Michigan for about 150 miles from the mouth. The principal commodities handled in the harbor are coal, stone, sand, and salt.

(1064) **Prominent features.**–Prominent are the easternmost stack on the N side of the river mouth, a radio tower 1.1 miles NW of the river mouth, and a yellow brick stack 2.3 miles NNW of the river mouth.

(1065) **Menominee Pierhead Light 4** (45°05.8′N., 87°35.2′W.), 46 feet above the water, is shown from a red octagonal tower on a square concrete base on the outer end of the N pier.

(1066) **Channels.**–A dredged entrance channel leads SW from deep water in Green Bay between parallel piers at the mouth of Menominee River and thence upstream for about 1.7 miles to about 600 feet below the Dunlap Avenue bridge. A turning basin is on the S side of the channel about 1 mile above the mouth. The entrance channel is marked by buoys, and the outer ends of the piers and the inner end of the N pier are marked by lights. In October 1993, the controlling depths were 17 feet (21 feet at midchannel) in the entrance channel to the piers, thence 20 feet (21 feet at midchannel) to the Ogden Street bridge, thence 18 feet (20 feet at midchannel) to the basin with 5 to 20 feet in the basin with the lesser depths found along the S and SE edges, thence 9 feet (18 feet at midchannel) to Menominee River Buoy 4, thence 9 feet to the upstream limit of the project.

(1067) Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

(1068) Currents in the river attain velocities up to 3 mph.

(1069) Above the dredged channel, the river has depths of 1 to 5 feet and is obstructed by numerous rocks. A dam blocks the river 1.7 mile above the dredged channel.

(1070) **Dangers.**–The entrance channel, lakeward of the piers, is bordered closely by shoals on either side. **Menominee Shoal,** a detached shoal with a least depth of 17 feet, is 0.8 mile NE of Menominee Pierhead Light and is marked on the E side by a lighted bell buoy. A 14-foot spot is 0.2 mile NE of the light.

(1071) **Bridge.**–A bascule highway bridge with a clearance of 18 feet at the center crosses Menominee River about 0.7 mile above the pierheads. (See **33 CFR 117.1 through 117.59 and 117.1091,** chapter 2, for drawbridge regulations.)

(1072) **Towage.**–Tugs for Menominee and Marinette are available from Sturgeon Bay and Green Bay. (See Towage under those ports.)

(1073) Marinette is a **customs port of entry.**

(1074) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(1075) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(1076) **Harbor regulations.**–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

(1077) **Wharves.**–There are three deep-draft facilities at Menominee and Marinette. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

(1078) **Menominee Paper Co. Dock:** N side of the river mouth; 600 feet of berthing space with dolphins; 19 feet alongside; deck height, 7 to 8 feet; 45,000 square feet covered storage; open storage for 30,000 tons of coal; receipt of coal and occasionally paper pulp; owned and operated by Menominee Paper Co.

(1079) **Marinette Fuel and Dock Co. Dock:** S side of the river mouth and N side of the slip at the river mouth; 900-foot face riverside, 18 to 21 feet alongside; 700-foot face slipside, 17 to 22 feet alongside; deck heights, 5 and 6 feet, respectively; 11 acres open storage; rail connections; receipt of stone, coal, sand, and salt; owned and operated by Marinette Fuel and Dock Co.

(1080) **The Ansul Co. Dock:** S side of the river 1.5 miles above the pierheads; 700-foot face; 19 feet alongside; deck height, 4 feet; open storage for 25,000 tons of coal; rail connections; occasional receipt of coal; owned and operated by The Ansul Co.

(1081) **Repairs.**–Marinette Marine Corp., a shipbuilder on the S side of the river 1.7 miles above the pierheads, can make emergency above-the-waterline repairs. A 40-ton mobile hoist is available.

(1082) **Small-craft facilities.**–A municipal marina developed by the city of Menominee and the Michigan State Waterways Commission is protected by breakwaters on the lakefront 1 mile NW of the river mouth and a private marina is on the S side of the river 2 miles above the pierheads. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, limited marine supplies, launching ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. A hoist for small sailboats and a 40-ton hoist that can handle craft to 65 feet long for hull and engine repairs are available.

(1083) **Charts 14902, 14909.**–From Menominee River, the shore is low and wooded for 24.5 miles NNE to Cedar River. Shoals extend as much as 1.3 miles from shore, with depths of 8 to 12 feet near the outer edge. **Ingalston** and **Arthur Bay** are small fishing settlements about 8 and 16 miles N of Menominee River, respectively.

(1084) **Cedar River, Mich.,** is a small village at the mouth of **Cedar River,** across Green Bay W of Porte des Morts Passage. The mouth of the river is protected by E and W piers. In 1978, the

E pier was in ruins and partially submerged. The approach to the river is marked by a buoy, and the outer end of the W pier is marked by a light. In 1968, the controlling depth was 5 feet between the piers and upstream for 0.4 mile to the fixed highway bridge at the head of navigation. The bridge has a clearance of 10 feet. Gasoline and a launching ramp are available at Cedar River.

(1085) **Whaleback Shoal,** with a least depth of 3 feet, is in the middle of Green Bay, 8.5 miles E of Cedar River. The shoal is marked at the NW end by a buoy and at the SE end by a lighted bell buoy. The shoal is a hazard to vessels, especially in foul weather. A dangerous wreck in about 45°21′29.4″N., 087°10′57.7″W. was reported in 1995, on the NE side of the shoal.

(1086) **Charts 14902, 14909, 14908.**–The shore is low and wooded from Cedar River NNE for 21 miles to Ford River. The shoal border in this stretch is irregular, and there are numerous submerged rocks. A 4-foot spot is 0.6 mile NE of **Deadmans Point,** 2 miles N of Cedar River. Just S of **Deer Creek,** 5.8 miles N of Cedar River, a shoal with two rocks covered about 1 foot near its outer end extends 0.7 mile from shore. A rock awash is 0.7 mile offshore 10 miles N of Cedar River.

(1087) **Time.**–Areas generally S and W of Deer Creek observe central standard time or central daylight saving time. Michigan communities N of Deer Creek observe eastern standard time or eastern daylight saving time.

(1088) **Charts 14908, 14915.–Little Bay de Noc** is the W arm of the N end of Green Bay. The bay is entered between **Fishery Point** on the W and Peninsula Point on the E. Very shallow ledges extend off both sides of the bay, but the natural channel up the middle of the bay has good deep water and permits the passage of the deeper draft vessels on the lakes.

(1089) **Ford River, Mich.,** is a small fishing village at the mouth of **Ford River** on the W side of the entrance to Little Bay de Noc.

(1090) From a point on shore about 4 miles SW of Ford River, a shoal bank extends about 6.5 miles E and thence N for about 7 miles to Sand Point at the city of Escanaba. The bank, forming the W limit of the deepwater channel into the bay, is marked on the SE side by a lighted buoy. Depths on the bank are 1 to 20 feet, but at the edge increase quickly to 50 feet and more in the channel.

(1091) A 24-foot spot, marked on the W side by a lighted buoy, is on the E side of the vessel route into the bay, 1.1 miles SE of Sand Point.

(1092) **Escanaba, Mich.,** is on the W side of Little Bay de Noc, 6 miles NE of Ford River and 7 miles NW of Peninsula Point. A lighted red brick cylindrical building in the city is prominent. **Sand Point,** marked by a private light, extends E from shore at the city and protects the harbor area on its N side. The harbor has depths of 28 to 40 feet within 0.4 mile of shore and affords access for the largest vessels on the lakes. **Escanaba River** flows into the harbor 2.5 miles NW of Sand Point.

(1093) **Escanaba Light** (45°44.8′N., 87°02.2′W.), 45 feet above the water, is shown from a white square tower with a green stripe on a crib on the NE side of the shoal on the N side of Sand Point; a fog signal is at the light. A buoy 0.35 mile W of the light marks the N side of an obstruction.

(1094) **Local magnetic disturbance.**–Differences from normal variation of up to 17° have been observed in the vicinity of Escanaba.

(1095) **Caution.**–A submerged piling, covered 22 feet, is 0.3 mile SE of Chicago and North Western Transportation Co., Ore Dock No. 6.

(1096) **Towage.**–Tugs are available from Sturgeon Bay. (See Towage under Sturgeon Bay.)

(1097) Escanaba is a **customs station.**

(1098) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(1099) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(1100) **Wharves.**–Escanaba has several deep-draft facilities on the W side of the harbor N of Sand Point. (For complete information on the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) All the facilities described have highway connections and some have railway connections.

(1101) **The C. Reiss Coal Co., Dock No. 2:** 1 mile WNW of Escanaba Light; 1,900-foot face; 21 to 24 feet alongside; deck height, 7 feet; open storage for 170,000 tons of coal; receipt of coal; owned and operated by The C. Reiss Coal Co.

(1102) **Chicago and North Western Transportation Co., Ore Dock No. 6:** 1.7 miles NW of Escanaba Light; 1,979-foot N and S faces; 28 to 31 feet alongside S face, 28 to 35 feet alongside N face; deck height, 2 feet at pilings increasing to 8 feet at top of dock fill; open storage for 2 million tons of material; one traveling ship loader, average rate, 4,000 tons per hour; shipment of iron ore and iron ore pellets; owned and operated by Chicago and North Western Transportation Co.

(1103) **Escanaba Coal and Dock Co., Dock No. 1:** 2.1 miles NW of Escanaba Light, 1,050-foot face; 21 to 27 feet alongside; deck height, 5 feet; open storage for 125,000 tons of coal; tank storage for 330,000 barrels; receipt of coal and petroleum products; owned by Escanaba Coal and Dock Co. and operated by Escanaba Coal and Dock Co., Upper Peninsula Power Co., and Standard Oil Division of Amoco Oil Co.

(1104) **Escanaba Terminal Dock:** 1 mile N of the mouth of Escanaba River; offshore wharf, 278 feet of berthing space with dolphins; 28 feet alongside; deck height, 9 feet; tank storage for 640,000 barrels; receipt of petroleum products; owned by U.S. Government and operated by Continental Services Co., Inc.

(1105) **Repairs.**–T.D. Vinette Co. makes emergency above-the-waterline repairs to vessels at their berths.

(1106) **Small-craft facilities.**–A small-craft basin, developed by the city and the Michigan State Waterways Commission, is on the S side of Sand Point. A small island, connected to the mainland by a bridge at the W end, forms the S side of the basin. The entrance to the basin has depths of 9 feet, with 1 to 12 feet in the basin. A private light on Sand Point marks the N side of the entrance. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, launching ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. A boatyard 0.5 mile S of Escanaba River has a 50-ton vertical boat lift and can make repairs to 80-foot vessels.

(1107) From Sand Point the shore extends N, then bends NE to Saunders Point at Gladstone. Very shallow water extends up to 0.6 mile from shore in this reach.

(1108) **Gladstone, Mich.,** is on the W side of Little Bay de Noc 7 miles N of Escanaba. **Saunders Point,** marked by a light extends E from shore at Gladstone and protects the harbor area on its N side. The E part of the harbor has depths of 23 to 30 feet with shoaling to less than 10 feet in the W part. Buoys mark the E and N extent of shoals on the N side of Saunders Point.

(1109) Lighted radio masts in Gladstone form a range useful as a guide into Little Bay de Noc, except in the vicinity of Sand Point where the range brings vessels too close to the shoals.

(1110) **Channels.**–A dredged channel, marked by buoys, leads from the deep water in Little Bay de Noc to a basin off the waterfront at Kipling, 1.5 miles N of Saunders Point. In 1977, the controlling depth was 23 feet in the channel and basin.

(1111) **Anchorage.–Squaw Point,** marked by a lighted buoy, extends from the E side of Little Bay de Noc 1.2 miles S of Saunders Point. A deep channel leads between the points, and owing to their respective positions, a virtually landlocked anchorage is formed above Saunders Point, mud bottom.

(1112) **Towage.**–Tugs are available from Sturgeon Bay. (See Towage under Sturgeon Bay.)

(1113) **Wharves.**–Gladstone has two deep-draft facilities on the N side of Saunders Point. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) The facilities described have highway connections.

(1114) **Marathon Oil Co. Dock:** 0.3 mile NW of Saunders Point Light; 145 feet of berthing space with dolphins; 19 feet alongside; deck height, 4 feet; tank storage for 160,000 barrels; open storage for 10,000 tons of coal; receipt of coal and petroleum products; owned by city of Gladstone and operated by Payne and Dolan.

(1115) **Upper Lakes Coal Co. Dock:** immediately W of Marathon Oil Co. Dock; 910-foot face; 20 feet alongside; deck height, 10 feet; open storage for 60,000 tons of bulk material; receipt of coal, salt, and miscellaneous bulk materials; owned and operated by Upper Lakes Coal Co.

(1116) **Small-craft facilities.**–A small-craft basin, developed by the city and the Michigan State Waterways Commission, is 1.2 miles SW of Saunders Point. The entrance to the basin, with a reported depth of 7 feet in 1978, is protected on the SW side by a pier and detached breakwater. The E end of the breakwater is marked by a private light and the entrance channel is marked by buoys. The basin has reported depths of 6 to 10 feet.

(1117) **Tacoosh River, Rapid River,** and **Whitefish River** flow into the N end of Little Bay de Noc through a common mouth between spits of land that extend from the E and W shores of the bay. An undefined, narrow, and tortuous channel through the mouth had a controlling depth of 3 feet in 1965.

(1118) Shoals extend about 1 mile from the head of Little Bay de Noc. From the head of the bay to Squaw Point, depths of 1 to 3 feet extend about 0.3 mile off the E shore. Below Squaw Point, the shoal border increases to a width of over 2 miles and is marked on the W side by a lighted buoy 5.1 miles S of Squaw Point opposite the village of **Stonington, Mich.** The shore in the vicinity of Stonington is bluff. Below Stonington the shoal border decreases from 0.5 mile wide to about 0.2 mile wide at **Dutchman Point,** 4 miles S. From Dutchman Point to Peninsula Point, the shore should be given a berth of 0.8 mile.

(1119) **Peninsula Point** (45°40.1′N., 86°58.0′W.) is the S point of the peninsula that separates Little Bay de Noc and Big Bay de Noc at the N end of Green Bay. **Peninsula Point Shoal,** a rocky ledge with depths of 1 to 6 feet, extends 1.1 miles S from the point. Depths less than 18 feet extend 1 mile farther S, and detached shoals reach about 8 miles S of Peninsula Point. **Eleven Foot Shoal,** with a least depth of 5 feet, is 2.2 miles S of the point. A lighted bell buoy is off the W side of the shoal. **Corona Shoal,** with a least depth of 12 feet, is 3.4 miles S of Peninsula Point. A buoy is 1.3 miles W of the shoal, on the E side of the vessel route into Little Bay de Noc.

(1120) **Charts 14908, 14909.–Minneapolis Shoal,** with a least depth of 15 feet, is 6.2 miles S of Peninsula Point. **Minneapolis Shoal Light** (45°34.9′N., 86°59.9′W.), 82 feet above the water, is shown from a square cream-colored tower on a concrete base on the shoal; a fog signal is at the light. The light should be given a berth of at least 0.25 mile. **Drisco Shoal,** with a least depth of 9 feet, is 2.4 miles SE of Minneapolis Shoal Light and is marked at the S end by a lighted buoy. **North Drisco Shoal,** a boulder bank covered 17 feet, is 1.5 miles ESE of Minneapolis Shoal Light. Several 21- to 24-foot spots are in the vicinity. These shoals lie close to the track of vessels bound from Rock Island and Porte des Morts Passages to Little Bay de Noc.

(1121) **Chart 14908.–Big Bay de Noc** is the NE arm of Green Bay, between Peninsula Point on the W and Garden Peninsula on the E. Numerous submerged net stakes are throughout the bay.

(1122) From Peninsula Point, the shore is low and wooded for 7.2 miles NE to **Chippewa Point.** Shoals extend from about 1 to 2 miles offshore. From Chippewa Point NNE for 6 miles to **St. Vital Point,** numerous rocks awash are within 1.1 miles of shore. **Round Island,** 4 miles ENE of Chippewa Point, is surrounded by shoals, 0.7 mile to N and 0.5 mile to S. A shoal with least depths of 2 feet is 0.9 mile NW of Round Island, 1.7 miles from the adjacent mainland shore. **Ripley Shoal,** with a least depth of 1 foot, is 1.3 miles N of Round Island. **St. Vital Island,** 1 mile E of St. Vital Point, is connected to it by a shallow bank with depths of 1 to 4 feet and rocks awash.

(1123) **Ogontz Bay** is a shallow bight on the NW side of Big Bay de Noc between St. Vital Point on the W and **Indian Point** on the E. Between Indian Point and **Stony Point,** 3.5 miles E, **Big Bay de Noc Shoal** extends 6.6 miles S into the center of Big Bay de Noc. The bank has depths of 3 to 7 feet at the S end and is marked at the S end by a buoy.

(1124) **Nahma, Mich.,** is a small village on the shore W of Stony Point and at the mouth of **Sturgeon River.** It contains the mills and docks of the American Playground Device Co. Three dilapidated docks extend about 450 feet into the bay, and E therefrom are the ruins of four other docks. There is a reported depth of about 12 feet between the docks, but they should be approached with extreme caution. The water is shoal on the W side of the W dock and on the E side of the E dock.

(1125) From Stony Point, the NE part of Big Bay de Noc extends NE for 3.8 miles to **Porcupine Point,** thence curves around through N to **Valentine Point** on the E side, thence extends SSW for 4.1 miles to **Ansels Point.** This part of the bay has central depths of 15 to 22 feet with gradual shoaling toward the shores. **Garden Bay,** on the S side of Ansels Point, has available depths of 8 to 12 feet and affords anchorage with protection from all but SW to NW winds. Between **Garden Bluff,** on the S side of Garden Bay, and **Middle Bluff,** white in color and 4 miles SSW, the shore is indented by a shallow bay. **Snake Island** is in the S end of the mouth of this bay, just N of Middle Bluff.

(1126) **Snail Shell Harbor,** a small cove just S of Middle Bluff, provides excellent protection for recreational craft. The entrance to the harbor is marked by a lighted bell buoy. In 1978, depths of 20 feet were reported in the entrance, with 10 feet along the W shore and 6 feet along the S shore. A Michigan State Waterways Commission dock with transient berths is in the cove. **Fayette, Mich.,** is a town at the head of the cove.

(1127) **Sand Bay,** the broad bight just S of Snail Shell Harbor, has deep water within 0.3 mile of shore. **Burnt Bluff,** on the S side of Sand Bay, is deep-to, and this trend continues S for 3 miles to the W point of Sac Bay. A small private artificial small-craft basin is on the W side of Burnt Bluff. Transient berths, water, and electricity are available.

(1128) **Sac Bay,** a small indentation in the SW end of Garden Peninsula, provides anchorage with protection from all but SE to W winds.

(1129) **Fairport, Mich.,** a small fishing settlement midway between Sac Bay and Point Detour, has several landings with depths of 5 to 6 feet at their outer ends. A sandy and stony flat connects the mainland shore at Fairport with the Summer Islands to the S. A narrow 6-foot channel leads across the flat, following close to the mainland shore. The channel is obstructed by a 1-foot spot, marked on the NW side by a buoy.

(1130) **Point Detour** (45°36.1′N., 86°36.7′W.), the S extremity of Garden Peninsula, is the N entrance point to Green Bay. The islands and passages S of the point were described previously.

(1131) Between Point Detour and Point aux Barques, 18 miles NE, the E shore of Garden Peninsula is broken by a series of bays and inlets opening to the E and S. Shoals extend about 0.8 mile S from Point Detour. A detached 16-foot shoal is 3.3 miles E of the first point N of Point Detour. From Point Detour to **Portage Bay,** 10 miles NE, the shore should be given a berth of 1 mile. Between Portage Bay and **Parent Bay,** 15 miles NE of Point Detour, rocks awash and shoals covered 1 to 6 feet extend as much as 2 miles offshore. Shoals extend over 1 mile SE from each side of the entrance to Parent Bay. Between the shoals, deep water extends to within 0.4 mile of the head of the bay. From Parent Bay E to Point aux Barques, shoals and rocks awash extend 1 mile from the bluff shore. At **Point aux Barques** (45°48.0′N., 86°21.0′W.) a shoal extends SE about 1.5 miles. In August 1982, a rock covered 5 feet was reported at the outer end of the shoal in about 45°47′08″N., 86°19′48″W.

(1132) From Point aux Barques, the low sandy shore trends N and then NE for about 12 miles to Manistique Harbor. In this stretch, shoals extend about 0.5 to 1 mile offshore, except at **Wiggins Point,** 4 miles N of Point aux Barques. **Wiggins Point Shoal,** with prevailing depths of 2 to 13 feet and rocks awash, extends about 2 miles offshore around the point. A lighted bell buoy marks the outer edge of the shoal.

(1133) **Manistique Harbor,** serving the town of **Manistique, Mich.,** is at the mouth of **Manistique River** on the N shore of Lake Michigan 73 miles W of the Straits of Mackinac. A stack 0.9 mile NNW of the river mouth and a silver tank 0.8 mile NNE of the river mouth are prominent.

(1134) **Manistique Light** (45°56.7′N., 86°14.8′W.), 50 feet above the water, is shown from a red tower on a concrete base on the outer end of the E breakwater; a fog signal and a radiobeacon are at the light.

(1135) **Channels.**–The dredged entrance channel leads NE from deep water in Lake Michigan between converging breakwaters through an outer basin to the mouth of the Manistique River. The W side of the river entrance is protected by a pier. The outer ends of the breakwaters and the pier are marked by lights. In July-August 1990, the controlling depths were 17 feet (19 feet at midchannel) in the entrance channel, thence 12 feet (15 feet at midchannel) in the basin, thence 10 feet (11 feet at midchannel) to a point about 500 feet below the head of the project, thence 8 feet to the head of the project.

(1136) The channel and basin are not adapted for anchorage, and mooring to the breakwaters and pier is prohibited.

(1137) The current in the channel attains velocities up to 3 mph.

(1138) Above the dredged channel, there are a number of abandoned wharves with channels between having depths of about 7 feet.

(1139) **Caution.**–Several shoals should be avoided by vessels approaching Manistique Harbor. A 23-foot spot is 3.1 miles S of Manistique Light. A rocky ledge, covered 18 feet, is 0.8 mile SSW of the light. Rock ledges, covered 8 to 17 feet, extend 0.4 mile S from the outer end of the E breakwater and 0.3 mile SW from the outer end of the W breakwater.

(1140) **Small-craft facilities.**–A small-craft basin developed by the town and the Michigan State Waterways Commission is on the E side of the river 0.3 mile above the mouth. Transient berths, gasoline, water, ice, electricity, launching ramps, and sewage pumpout facilities are available.

(1141) From Manistique Harbor E for 4.5 miles to **Dutch Johns Point,** shoals extend 0.3 to 1.2 miles offshore. A detached 16-foot spot is 2 miles SE of the point, and detached 19-foot spots are 1.7 and 2.3 miles S of the point. These shoals should be avoided when approaching Manistique Harbor.

(1142) **Chart 14911.**–About 2.5 miles E of Dutch Johns Point, the shoal border decreases to 0.3 mile wide for about 9.5 miles ESE to Seul Choix Point. **Seul Choix Point Light** (45°55.3′N., 85°54.7′W.), 80 feet above the water, is shown from a white conical tower connected to a red dwelling on **Seul Choix Point.**

(1143) A bay that opens between Seul Choix Point and **Hughes Point,** 4.5 miles NE, is protected from the N and W and has deep water within 0.8 mile of shore. A detached shoal with a least depth of 9 feet is 0.9 mile S of Hughes Point.

(1144) **Port Inland** is a private harbor of the Inland Lime & Stone Co., built on the lake in front of the company's plant about 4 miles NE of Seul Choix Point.

(1145) The harbor basin is protected by a breakwater, marked at the outer end by a private light with a fog signal, that extends S and W from shore. The privately dredged entrance channel has reported depths of about 30 feet and is marked by a private **000°** lighted range. A private **047°** lighted range marks the channel through the harbor basin.

(1146) Limestone is shipped from a 900-foot wharf on the NW side of the basin. The wharf has a deck height of 9 feet and reported depths of 25 feet alongside. There is open storage for 200,000 tons of limestone.

(1147) From Hughes Point, the shore trends E for 7 miles to **Scott Point** and thence 2 miles to **Point Patterson** (45°58.1′N., 85°39.3′W.). This stretch is filled with shoals and rocks extending 0.5 to 1 mile offshore.

(1148) From Point Patterson, the shore extends NE for 11 miles, thence E for 3.5 miles to **Millecoquins Point** (46°05.2′N., 85°26.8′W.). NE of Point Patterson the shoal border increases to a width of 2.8 miles and thence decreases to about 0.4 mile in the bight W of Millecoquins Point. Numerous submerged net stakes are within about 5 miles of shore in this stretch. **Cranberry Shoal,** with rocks awash, is 1.7 miles offshore 5.7 miles NE of Point Patterson. A detached 11-foot shoal is 1.3 miles WSW of Millecoquins Point, and a rock awash is 0.3 mile offshore 1 mile W of the point.

(1149) **Naubinway Island,** about 0.8 mile S of Millecoquins Point and marked by a light, is a small island surrounded by rocks and shoals. A 1-foot spot is 0.6 mile E of the island, and a detached 14-foot shoal is 0.8 mile SW of the island. **Naubinway Reef,** a rocky ledge with a least depth of 4 feet, is 1.5 miles SE of

Naubinway Island. A detached 14-foot spot is midway between the reef and island.

(1150) **Potter Reef,** with a least depth of 1 foot and marked on the NE side by a buoy, is 7.3 miles SSW of Millecoquins Point and 6.5 miles ENE of Point Patterson. **Millecoquins Reefs** is a group of detached 7- to 13-foot spots that extend over 2 miles NW and SE, about 5 miles S of Millecoquins Point. A buoy marks the W end of the reefs. A number of detached shoal spots are within 3.5 miles S of Millecoquins Reefs. The shoalest are a boulder covered 9 feet 1.4 miles SE, 12-foot spots 2.2 and 3 miles S, and a 14-foot spot 1.3 miles SW. These reefs and shoals are out of the normal vessel routes and are unmarked.

(1151) Lansing Shoals, Fagan Reef, Simmons Reef, and other shoals farther S in the vicinity of Beaver Island are described earlier in the chapter.

(1152) Between Millecoquins Point and **Biddle Point,** 3.3 miles E, a small bay has general depths of 12 feet or more with shoals within 0.4 mile of shore. On the W side of the bay, 2- and 7-foot spots are 0.6 mile ENE and E of Millecoquins Point, respectively.

(1153) **Naubinway, Mich.,** is a village on the W side of the bay, just N of Millecoquins Point. A former lumber dock on the N side of the point has washed out except for a few piles. Good shelter for craft drawing up to 10 feet is behind the small point just NE of Millecoquins Point, but the approach is rendered dangerous by the shoals E of Millecoquins Point. A small-craft harbor developed by the Michigan State Waterways Commission on the NE side of Millecoquins Point is protected by a breakwater. Transient berths, water, electricity, and a launching ramp are available.

(1154) From Biddle Point E for 9 miles to **Point Epoufette** (46°02.8′N., 85°11.7′W.), the shore is irregular and rocks and shoals extend 3 miles offshore in the bight just E of Biddle Point decreasing to 1 mile offshore just W of Point Epoufette. **Pelkie Reef,** with a depth of 11 feet at the N end and a rock awash at the S end, is 1.7 miles offshore 2.7 miles SW of Point Epoufette. A detached boulder ledge, covered 6 feet, is 1.5 miles WSW of Pelkie Reef. A 14-foot spot is 3 miles W of Pelkie Reef. Detached 16- and 17-foot spots are 1.1 miles SSW and 0.9 mile S of Point Epoufette, respectively.

(1155) **Charts 14880, 14911, 14881.**–From Point Epoufette, the shore bends SE for 17 miles to **Point aux Chenes** (45°55.5′N., 84°54.6′W.). The shoal border reaches an extent of 1.8 miles about 4 miles E of Point Epoufette, thence decreases to 0.2 mile wide 3 miles N of Point aux Chenes. At Point aux Chenes, shoals and boulders, covered less than 18 feet, reach 1.5 miles W and 2.5 miles NW.

(1156) About 4.5 miles SE of Point Epoufette, a privately dredged channel, with a controlling depth of 24 feet in 1978, leads from deep water in Lake Michigan E to a private harbor of Sand Products Corp.

(1157) **Manitou Paymen Shoal,** with depths of 1 to 10 feet and a dangerous rock awash at the center, is 4 miles offshore, 8 miles SE of Point Epoufette. A buoy marks the S side of the shoal. A boulder, covered 18 feet, is 0.9 mile SSE of the buoy.

(1158) Between Point aux Chenes and **Gros Cap,** 5.7 miles SE, the shore is indented by small bays with shallow depths and rocks, awash and submerged. A boulder ledge, with a least depth of 17 feet, is 2.2 miles S of Point aux Chenes. **West Moran Bay,** on the SE side of Gros Cap, affords protection for small craft from N to E winds.

(1159) **St. Helena Island,** 2 miles SW of Gros Cap, is marked by a light on the SE end. Shoals extend about 0.3 mile off the NW, SW, and SE sides of the island. A buoy marks the SE edge of the shoals. Approaching from the W, the island should be given a wide berth.

(1160) **St. Helena Shoal,** 2 miles W of St. Helena Island, is 1.3 miles long E and W and has a least depth of 4 feet. A buoy marks the SW side of the shoal. Do not attempt to round the NW end of St. Helena Island at night unless its appearance under Gros Cap and the position of St. Helena Shoal are well understood.

(1161) From West Moran Bay SE for 2.5 miles to Point La Barbe, shoals extend about 1 mile offshore. **Point La Barbe** is the SW point of Point St. Ignace, which forms the S side of the Straits of Mackinac. **Green Island** and several small islets are on the shoal bank off Point La Barbe.

(1162) **Mackinac Bridge** crosses the Straits of Mackinac between Point St. Ignace on the N and Mackinaw City on the S. The center span of the suspension bridge has a clearance of 148 feet at the center decreasing to 135 feet at each end. The approaches to the bridge are marked by lighted and unlighted buoys. A private fog signal is under the main bridge span on the channel line. (Mackinac Bridge is described more completely at the beginning of this chapter.)

(1163) **Currents.**–Currents in the Straits of Mackinac, particularly NE of Mackinac Bridge in the vicinity of the Graham Shoals, are often strong and irregular.

(1164) The Straits of Mackinac E of Mackinac Bridge are described in chapter 10.

# 12. ST. MARYS RIVER

(1) **Chart Datum, St. Mary's River.**–Depths and vertical clearances given in this chapter are referred to the sloping surface of the river above the locks when Lake Superior is at Low Water Datum, elevation 601.1 feet (183.2 meters), and the gage above the U.S. locks reads 600.6 feet (183.1 meters), and below the locks when the gage below the U.S. locks reads 578.4 feet (176.3 meters) and Lake Huron is at Low Water Datum, 577.5 feet (176.0 meters). These elevations are above mean water level at Rimouski, Quebec, on International Great Lakes Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

(2) **Charts 14882, 14883, 14884.–St. Marys River** forms the outlet of Lake Superior, connecting it with Lake Huron. From **Whitefish Bay** at the SE corner of Lake Superior, the river flows in a general SE direction to empty into Lake Huron at Point De Tour, a distance of 63 to 75 miles depending on the route traveled. The river is bounded on the W side for its entire length by the E end of the upper peninsula of Michigan and on the E side by the Ontario mainland in the upper part and **Drummond Island, MI** and **St. Joseph Island, Ont.** in the lower part.

(3) **Canadian Waters.**–The **International Boundary** enters the St. Marys River near the S tip of St. Joseph Island. As one proceeds upstream in the river the Boundary enters Course 9 of the dredged channel E of Neebish Island, MI. The Boundary is approximately on centerline of the channel through Course 8 and 7 to the vicinity of the lower end of Sugar Island, MI. There, the Boundary departs from the ships channel, and skirting the E shore of Sugar Island enters Lake George. The Boundary skirts the N shore of Sugar Island and re-enters the ships channel in Course 1. The Boundary lies in St. Marys Falls with the American Locks to the S and the Canadian Locks to the N. Thence the Boundary lays roughly centerline between the land masses of Michigan and Ontario until it reaches Whitefish Bay of Lake Superior.

(4) For a detailed description of shoreline, waterways, and ports in Canadian waters relating to the St. Marys River see **Canadian Sailing Directions-Great Lakes, Volume II.**

(5) **De Tour Passage,** at the mouth of the river, extends N from Lake Huron. The W side of the passage extends from **Point De Tour** to **Gaffney Point,** 4 miles N, and the E side extends from **Barbed Point** to **Black Rock Point,** 3 miles N.

(6) After passing through De Tour Passage, the river turns NW and widens. Between Black Rock Point and the S end of St. Joseph Island, the river extends across the mouth of Potagannissing Bay. From **Old Fort St. Joe Point** at the S end, the river extends along the W side of St. Joseph Island for about 19 miles to **Stribling Point** at the N end. About 3 miles NW of Old Fort St. Joe Point, the river narrows between **Hay Point** and **Point aux Frenes. Munuscong Lake** is the widening in the river between Point aux Frenes and the foot of Neebish Island, about 8 miles N.

(7) **Neebish Island,** about 8 miles long and 4 miles wide, is in midriver opposite the N end of St. Joseph Island. Narrow channels lead around either side of the island. **Sugar Island,** just N of Neebish Island, is about 15 miles long N and S and has a maximum width of about 8 miles at the N end. **Lake George** separates the E side of the island from the Ontario mainland, and **Lake Nicolet,** through which flows the main channel of the river, is W of the island. A narrow channel leads from the N end of Lake George around the N end of Sugar Island and joins with the channel that leads N from Lake Nicolet.

(8) From the junction, the river extends 2 miles W between the cities of Sault Ste. Marie in Michigan and Ontario to **St. Marys Falls** and the canals and locks which overcome them. Above the locks, the river extends 5 miles SW to the narrows between **Pointe aux Pins** and **Brush Point,** thence W for 3 miles before turning NW around **Pointe aux Chenes** and extending about 5 miles to the head of the river in Whitefish Bay.

(9) **Channels.**–A series of dredged deep-draft channels lead through the St. Marys River to connect the deep water of Lake Huron with that of Lake Superior. A detailed description of the various channel reaches is given later in the chapter. These channels are well marked by lighted and unlighted buoys and lighted ranges.

(10) Throughout much of the river, dumping grounds for dredging spoils are close outside the dredged channels and may be very shoal or in the form of small islands. These areas must be avoided.

(11) All salt water vessels transiting the lock systems along the St. Marys River which are not equipped with either bow or stern thrusters, are required to be assisted by one or more tugs to ensure that full control of the vessel is maintained at all times. Tugs are also required for all power vessels which experience control problems at low speeds, or in close quarters.

(12) **Limiting Dimensions (in feet) of Through Channel:**

(13) **In MacArthur Lock**–length, 800; width, 80; depth, *31.

(14) **In Poe Lock**–length, 1,200; width, 110; depth *32.

(15) **In Davis and Sabin Locks**–length, 1,350; width, 80; depth, 23.

(16) **In Canadian Lock**–length, 225; width, 49; depth, 9½.

(17) **In improved river channels:**

(18) Upbound (westerly side)–width, 300; depth, 27.

(19) Upbound (easterly side)–width, 200; depth, 21.

(20) Downbound–width, 300; depth, 27.

(21) *Governing depth in South Canal approaches to lock is 27½ feet.

(22) **Note.–The depths given in this chapter for the improved dredged channels in the St. Marys River are the Federal project depths. The Corps of Engineers makes periodic bar sweeps through all the improved dredged reaches of the St. Marys River, and these channels are well maintained at the project depths. Any depths found to be less than the project depths are published in the Local Notice to Mariners.**

(23) **Fluctuations of water level.**–Each year the St. Marys River rises and falls about 1 foot as measured by the monthly mean levels. Since 1900, the difference between the highest and the lowest monthly mean levels above the locks has been about 4 feet and below the locks about 6 feet. From day to day, the level fluctuates somewhat due to changes of wind and barometric pressure; such fluctuations frequently amount to several inches and sometimes to 1 foot or more. In addition to these changes in level, barometric pressure changes occasionally cause a considerable

oscillation to take place within a short period; such changes amounting to over 5 feet have been known to occur within 3 hours. As much of the present sailing route in the St. Marys River has been made navigable by dredging, the changes in level have a direct effect on the available depth.

(24) **Currents.**–As the speed limits established for the St. Marys River in **33 CFR 161.880 and 161.886**, chapter 2, refer to the speeds over the bottom, and as the currents in the river are variable, masters are cautioned to regulate the speed of their vessels by running on time from point to point instead of relying on the number of revolutions per minute of the propeller.

(25) The swiftest currents in the navigable channels of the St. Marys River are found at Little Rapids cut (course 2), West Neebish Channel Light 29, Six Mile Point, and West Neebish Channel rock cut (course 6). The strength of the current depends largely upon the discharge of the river and the elevation of the water surface at the mouth of the river. The discharge of the river is now under control and is varied according to water-level requirements. When the water surface at the upper end of Lake Huron is high, because of E or S winds or because of barometric variations, the current velocity is temporarily checked. When the stage on Lake Superior is such that a large flow is being permitted, the current is strong and is further increased if the level of Lake Huron is low.

(26) The attention of masters is also directed to the fact that at times the current over the rapids at Sault Ste. Marie is slight, while a very strong set is often experienced when passing the inlets of both the Michigan and Ontario power canals, adjacent S and N of the locks at Sault Ste. Marie, respectively. This is especially true of the Ontario canal where vessel masters have encountered difficulty through attaching too much importance to the rapid's current and not enough to that of the power canal.

(27) It is well to note that E and S winds make high water below the locks and low water above the locks and that W and N winds have the opposite effect.

(28) Currents for the following locations in the St. Marys River are given at high water flow of 110,000 cubic feet per second (cfs), medium water flow of 76,000 cfs, and low water flow of 57,000 cfs, respectively.

(29) Little Rapids cut (course 2): 2.2 mph (2.0 knots), 1.6 mph (1.4 knots), and 1.4 mph (1.2 knots)

(30) West Neebish Channel Light 29: 1.8 mph (1.6 knots), 1.3 mph (1.1 knots), and 1.0 mph (0.9 knots)

(31) Six Mile Point: 1.6 mph (1.4 knots), 1.1 mph (1.0 knots), and 1.0 mph (0.8 knots)

(32) West Neebish Channel rock cut (course 6): 1.5 mph (1.3 knots), 1.1 mph (0.9 knots), and 0.8 mph (0.7 knots)

(33) Middle Neebish Channel dike (course 6): 1.4 mph (1.2 knots), 1.0 mph (0.9 knots), and 0.9 mph (0.8 knots).

(34) **Ice.**–The upper and lower parts of the St. Marys River each average ice thicknesses of 14 and 17 inches and average maximum thicknesses of 20 and 26 inches, respectively. The river is not much affected by wind, and the channel track remains well defined with a stable ice sheet outside the channel. Broken pieces of ice accumulate in the channels and may become concentrated in some bottleneck areas. In some reaches, brash ice may accumulate up to 4 feet thick around mid-January. (See Winter Navigation, chapter 3.)

(35) **A Vessel Traffic Service (St. Marys River),** operated by the U.S. Coast Guard, has been established for St. Marys River and lower Whitefish Bay from De Tour Reef Light to Ile Parisienne Light, except for the waters of the St. Marys Falls Canal. The Service is designed to prevent collisions and groundings and to protect the navigable waters concerned from environmental harm resulting from such collisions or groundings.

(36) The Vessel Traffic Service provides for a Vessel Traffic Center (VTC), that may regulate the routing and movement of vessels by movement reports of vessels, specific reporting points, and VHF-FM radio communications. The Service includes one- and two-way traffic areas, areas of allowed and prohibited anchorage, and speed limits.

(37) The Vessel Traffic Center, call sign "Soo Traffic," is operated continuously, and maintains radiotelephone communications with vessels on VHF-FM channel 16 and channel 12.

(38) Participation in the Service is mandatory for certain vessels. (See **33 CFR 161.801,** chapter 2, for classes of vessels affected.)

(39) This Service is intended in no way to relieve any person of complying with the navigation rules for harbors, rivers, and inland waters generally; the Inland Navigation Rules; Vessel Bridge-to-Bridge Radiotelephone Regulations; the Federal Boating Safety Act of 1971, or any other law or regulation.

(40) See St. Marys Falls Canal, this chapter, for procedures and regulations affecting vessel operations approaching and traversing St. Marys Falls Canal.

(41) The initial reporting point for upbound vessels is abeam De Tour Reef Light; for downbound vessels, abeam Ile Parisienne Light in Whitefish Bay. Permanent reporting points have been established throughout the waterway. Temporary or seasonal reporting points are established as conditions dictate. (See **33 CFR 161.801 through 161.894,** chapter 2, for rules affecting vessel operations in the Vessel Traffic Service.)

(42) **Pilotage.**–The waters of St. Marys River, bounded at the lower end by latitude 45°59′N., and at the upper end by longitude 84°33′W., are Great Lakes designated waters. Registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for the St. Marys River are supplied by Western Great Lakes Pilots Association. (See appendix for address.) Pilot exchange points are at the lower entrance to the river off De Tour, Mich., and at the upper entrance to the river about 3.5 miles SE of Point Iroquois. The pilot boat at De Tour, LINDA JEAN, has a green hull and a white cabin. The pilot boat at the head of the river, J. P. IX, docks just above the locks at Sault Ste. Marie. (See Pilotage, chapter 3, and **46 CFR 401,** chapter 2.)

(43) **Chart 14882.–De Tour Passage** forms the mouth, or S end, of St. Marys River. The passage has deep water for a width of over 2,500 feet between the E end of the upper peninsula of Michigan on the W and the W end of Drummond Island on the E. The shoals that border the passage are well marked.

(44) **De Tour Reef**, a rocky ledge covered 15 feet, is 0.7 mile SE of **Point De Tour** on the W side of the entrance to De Tour Passage. **De Tour Reef Light** (45°56.9′N., 83°54.2′W.), 74 feet above the water, is shown from a white square tower on a concrete crib on De Tour Reef; a fog signal, a radiobeacon, and a radar beacon (Racon) are at the light.

(45) **De Tour Shoal,** 0.8 mile N of De Tour Reef, is marked on the E side by a buoy that marks the W edge of the deep water through the passage.

(46) **Crab Island Shoal**, with boulders just below the surface, is on the E side of the passage, 1.3 miles E of Point De Tour. A lighted bell buoy marks the W edge of the shoal. Adjacent W of the buoy, De Tour Passage has been dredged to a depth of 30 feet.

(47) **Frying Pan Shoal,** boulders covered 18 feet, extends about 0.25 mile from shore on the W side of the passage 2.2 miles

N of De Tour Reef Light. **Frying Pan Island,** 0.3 mile N of Frying Pan Shoal, is marked on the E side by a light. An abandoned fueling dock on the SE side of the island has a depth of about 21 feet alongside.

(48) **De Tour Village, Mich.,** is on the W side of De Tour Passage NW of Frying Pan Island. A ferry for passengers, autos, and limited freight operates year round from the village across the passage to Drummond Island. Small craft landing at De Tour Village must take care to avoid submerged cribs and dock ruins. A Michigan State Waterways Commission small-craft harbor protected by a breakwater is about 400 yards N of the ferry pier. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9.

(49) A **U.S. Customs** representative is available at De Tour village. The breakwater is marked by a light on its S end.

(50) The W shore of Drummond Island fronts De Tour Passage from **Barbed Point** N for 3 miles to **Black Rock Point.** Dolomite is shipped from an 800-foot dock of Osborne Materials Co., 1.3 miles N of Barbed Point. The dock has a deck height of 10 feet and reported depths of 23 feet alongside. A conveyor system can load vessels at 4,000 tons per hour. Buoys mark shoals N and S of the dock.

(51) **Gaffney Point** (46°00.7′N., 83°54.5′W.) is on the W side of De Tour Passage 1.4 miles N of De Tour Village. **Watson Reefs** is a narrow shoal about 0.2 mile offshore between Gaffney Point and the village. Buoys mark the NE and SE sides of the shoal, and a light is near the center. **Pipe Island,** marked on the SW side by a light, is 0.6 mile NE of Gaffney Point. A buoy marks the extent of shoals SW of the island. **Pipe Island Twins** is a pair of small islands about 0.5 mile NE of Pipe Island with shoals between. The E island is marked at the N end by a light, and shoals that extend N from the light are marked by a lighted buoy. **Pipe Island Shoal,** with a least depth of 11 feet, is 0.5 mile SE of Pipe Island. A lighted buoy marks the SE side of the shoal.

(52) **Squaw Island,** marked at the S end by a light, is 1.4 miles N of Pipe Island. Detached 18- and 22-foot spots are 0.3 and 0.6 mile WNW of Squaw Island, respectively.

(53) A coaling station of the Interlakes Steamship Company is at a 1,000-foot wharf 0.6 mile NW of Gaffney Point. The reported controlling depth is 26 feet along the lower 700 feet of the wharf face. A shoal with a least depth of 22 feet is about 400 feet NE of the face.

(54) **Sweets Point** is about 2 miles NW of Gaffney Point. Shoals extend about 0.6 mile N from the point and are marked near the outer end by a light.

(55) **Raber Point** (46°04.0′N., 84°01.9′W.), 7 miles NW of Gaffney Point, is the S entrance point to **Raber Bay. Lime Island** is in the middle of the river, 1.7 miles NE of Raber Point. An 800-foot wharf is the W side of Lime Island. The wharf, marked at its S end by two lights, has least depths of about 17 feet along the upper 300 feet and 25 feet along the lower 500 feet. In 1988, it was reported that the wharf was no longer in operation.

(56) At the N end of De Tour Passage, the upbound and downbound vessel channels are divided by the Pipe Island group. The upbound channel leads N on the E side of Pipe Island Shoal. Abreast Pipe Island Twins Light, the channel turns NW, leads S of Squaw Island, and rejoins the downbound channel N of Sweets Point. **Pipe Island Course,** downbound, leads SE from Sweets Point between Gaffney Point and Pipe Island to the N end of De Tour Passage. These channels have a depth of 29 feet.

(57) **Lime Island Channel,** upbound and downbound, leads NW from Sweets Point to the turn between Raber Point and Lime Island and has a depth of 29 feet. At the turn, a lighted midchannel buoy separates the two-way traffic.

(58) **Round Island Course,** upbound and downbound, leads N from the turn at the upper end of Lime Island Channel for 3.5 miles to the turn between Point aux Frenes and Hay Point. The depth in the channel is 28 feet. **Round Island,** marked by a light, is on the W side of the channel near its midlength.

(59) **Point aux Frenes** (46°07.9′N., 84°01.7′W.) is on the W side of the river at the turn from Round Island Course into Munuscong Lake. Lights mark the course changes in the turn.

(60) **Charts 14882, 14883.–Munuscong Lake** is a widening in St. Marys River from Point aux Frenes upstream to Neebish Island. **Lower Course 8,** upbound and downbound, leads from the turn at Point aux Frenes NW for 4.6 miles through Munuscong Lake. The depth in the channel is 28 feet. The channel is marked at the lower end by a **128°** lighted range on **Hay Point.**

(61) **Chart 14883.**–Near the middle of Munuscong Lake, at the upper end of Lower Course 8, the dredged channel of the St. Marys River divides to lead around either side of **Neebish Island.** The upbound channel leads generally N between the E side of Neebish Island and St. Joseph Island, thence WNW between the N side of Neebish Island and the S end of **Sugar Island,** thence N again in Lake Nicolet to the junction with the downbound channel. The channel is about 17.5 miles long between the junctions with the downbound channel. The courses through this stretch are well marked by lighted and unlighted buoys and ranges.

(62) **Course 10,** marked by a **321°** lighted range on the S end of Neebish Island, leads NW for 2.1 miles from the junction with the downbound channel at the upper end of Lower Course 8. The channel has a depth of 27 feet for a least width of 500 feet.

(63) **Course 9** leads 3.6 miles NNE to **Johnson Point** on the SE side of Neebish Island. The E side of the channel has a depth of 21 feet for a width of 200 feet. The W side has a depth of 27 feet for a least width of 300 feet. The W side of the channel is marked by a **017°** lighted range at the upper end, and the E side is marked by an unlighted range.

(64) **Wharf.**–An L-shaped **Public wharf,** known locally as **C Line Dock,** NW of the front range light has a 46-foot (14 m) south face with a least depth of 2 feet at the shore end; 45-foot (14 m) west face with a least depth of 4 feet (1.2 m); 16-foot (4.9 m) north face with a least depth of 5 feet (1.5 m); deck height 5 feet (1.5 m). A launch ramp is near by.

(65) **Course 8** leads NW for 1 mile from Johnson Point to **Mirre Point.** The NE side of the channel has a depth of 21 feet for a width of 400 feet, and the SW side has a depth of 28 feet for a least width of 600 feet. The deep side of the channel is marked by a **134°56′** lighted range at the lower end and a **314°** lighted range at the upper end.

(66) **Course 7, Munuscong Channel,** leads N for 3.2 miles from Mirre Point to **Stribling Point** (46°18.8′N., 84°06.9′W.), the NW point of St. Joseph Island. The E side of the channel has a depth of 21 feet for a width of 200 feet, and the W side has a depth of 27 feet for a least width of 300 feet. The E side of the channel is marked by a **177°** range at the lower end and a **357°** range at the upper end. The deep side is marked by a **177°** lighted range at the lower end and a **357°** lighted range at the upper end.

(67) At the turn from the upper end of Course 7 into Course 6, a passage leads NE between Stribling Point and **Harwood Point,** the SE point of Sugar Island, to connect with St. Joseph Channel and the channel that leads N to Lake George. **St. Joseph Channel** separates St. Joseph Island from the mainland and leads E to con-

nect with North Channel. (Several localities in St. Joseph Channel are described in chapter 10.)

(68) **Lake George** separates the E side of Sugar Island from the Ontario mainland. A channel, well marked by lighted and unlighted buoys, leads N from Harwood Point to the lake, and thence from the N end of the lake around the N side of Sugar Island to connect with St. Marys River at Sault Ste. Marie. The channel has a depth of about 10 feet. The buoys marking Lake George channel are not charted because the positions are frequently shifted to mark the best water.

(69) **Course 6, Middle Neebish Channel,** leads WNW for 3.2 miles from Stribling Point between the N side of Neebish Island and the S side of Sugar Island to the lower end of **Lake Nicolet.** The N side of the channel has a depth of 21 feet for a least width of 200 feet and is marked at the lower end by a **112°** range. The S side of the channel has a depth of 28 feet for a least width of 300 feet and is marked at the lower end by a **111°55′** lighted range and at the upper end by a **292°** lighted range. A dike, marked at the center and ends by lights, borders the N side of the channel for 1.2 miles near midlength of the course. The range structures at the upper end of the course are in the open water of Lake Nicolet. They are well protected with riprap and should not be passed close aboard.

(70) **Course 5** leads NW from the lower end of Lake Nicolet for about 4.5 miles to the junction with the downbound channel near midlake. The E side of the channel has a depth of 21 feet for a width of 200 feet and is marked at the lower end by a **150¼°** range. The W side of the channel has a depth of 27 feet for a least width of 300 feet and is marked at the lower end by a **150°** lighted range.

(71) **West Neebish Channel,** downbound, diverges from the upbound channel near the middle of Lake Nicolet and leads generally S for about 16.5 miles between the W side of Neebish Island and the mainland to the lower junction with the upbound channel S of Neebish Island in Munuscong Lake. The courses through this stretch are well marked by lighted and unlighted buoys, lights, and lighted ranges.

(72) **Course 4** is a continuation of the downbound portion of Course 4, upbound and downbound, which leads through the middle of Lake Nicolet. From the junction with the upbound channel, Course 4 leads SSE for 2.5 miles to the lower part of the lake. The channel has a depth of 27½ feet and is marked by a **160°** lighted range.

(73) **Course 5** leads S from the lower part of Lake Nicolet for 4.4 miles to the rock cut on the W side of Neebish Island. The channel has a depth of 27½ feet and is marked by a **181°30′** lighted range.

(74) **Course 6** leads SE from the head of the rock cut for 2.7 miles to a point about 0.5 mile N of **Sawmill Point.** The upper part of this course, through the cut, is bordered on either side by a vertical rock masonry wall marked by lights. The channel has a depth of 28½ feet and is marked at the lower end by a leading light.

(75) A well-protected small-craft anchorage with mud bottom and 3 to 15 feet of water is reported on the NE side of Course 6 about 1.2 miles above Rock Cut Lower Leading Light between a spoil island and a dike.

(76) **Course 7** leads S from the turn 0.5 mile N of Sawmill Point for 2.4 miles to **Moon Island.** The channel has a depth of 28½ feet and is marked by a leading light on the N end of Moon Island.

(77) **Course 8** leads SE from Moon Island for 4.6 miles through the upper part of Munuscong Lake to the junction with the upbound channel S of Neebish Island. The channel has a depth of 27½ feet.

(78) **Course 4,** upbound and downbound, leads through the middle part of Lake Nicolet from the vicinity of **Ninemile Point** (46°23.6′N., 84°13.7′W.) NNW for 3.5 miles to **Six Mile Point.** The channel has a depth of 29 feet for a width of 1,500 feet. The upbound, E, side of the channel is marked by a **339½°** lighted range, and the downbound side is marked by a **160°** lighted range at the S end of Lake Nicolet.

(79) An **anchorage,** with a depth of 28 feet and marked by buoys, is adjacent to the downbound side of Course 4 opposite Ninemile Point.

(80) **Charts 14883, 14884.–Course 3** and **Course 2, Little Rapids Cut,** lead NNW from Six Mile Point for about 4.5 miles to the turn above Mission Point. The channel has a depth of 27 feet for a least width of 600 feet. A leading light on the W side of Sugar Island marks Course 3 downbound, and a **323°20′** lighted range at **Frechette Point** (46°27.5′N., 84°16.9′W.) marks Course 3 upbound. A **153°** lighted range at Six Mile Point marks Course 2 downbound.

(81) Small-craft facilities are at Six Mile Point and Frechette Point. A small-craft channel marked by buoys leads NW from Course 2 on the N side of Frechette Point between the mainland and **Island No. 3**. There is no access from this channel at its upper end to the main channel. A marina developed by Michigan State Waterways Commission and private marinas are on the mainland side of this channel, opposite the lower end of Island No. 2. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, minor repairs, launching ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9. An 8-ton marine railway is available.

(82) **Mission Point** (46°29.2′N., 84°18.2′W.), marked by a light, is on the W side of the river just below the turn at the upper end of Course 2. A ferry operates across the river from Mission Point to **Island No. 1.**

(83) Three ice stabilization islands marked by lights are on the SW side of the river about 0.1, 0.3 and 0.45 mile above Light 99.

(84) In December 1981, a submerged obstruction was reported in about 46°29′10″N., 84°18′08″W., about 100 feet off the ferry dock.

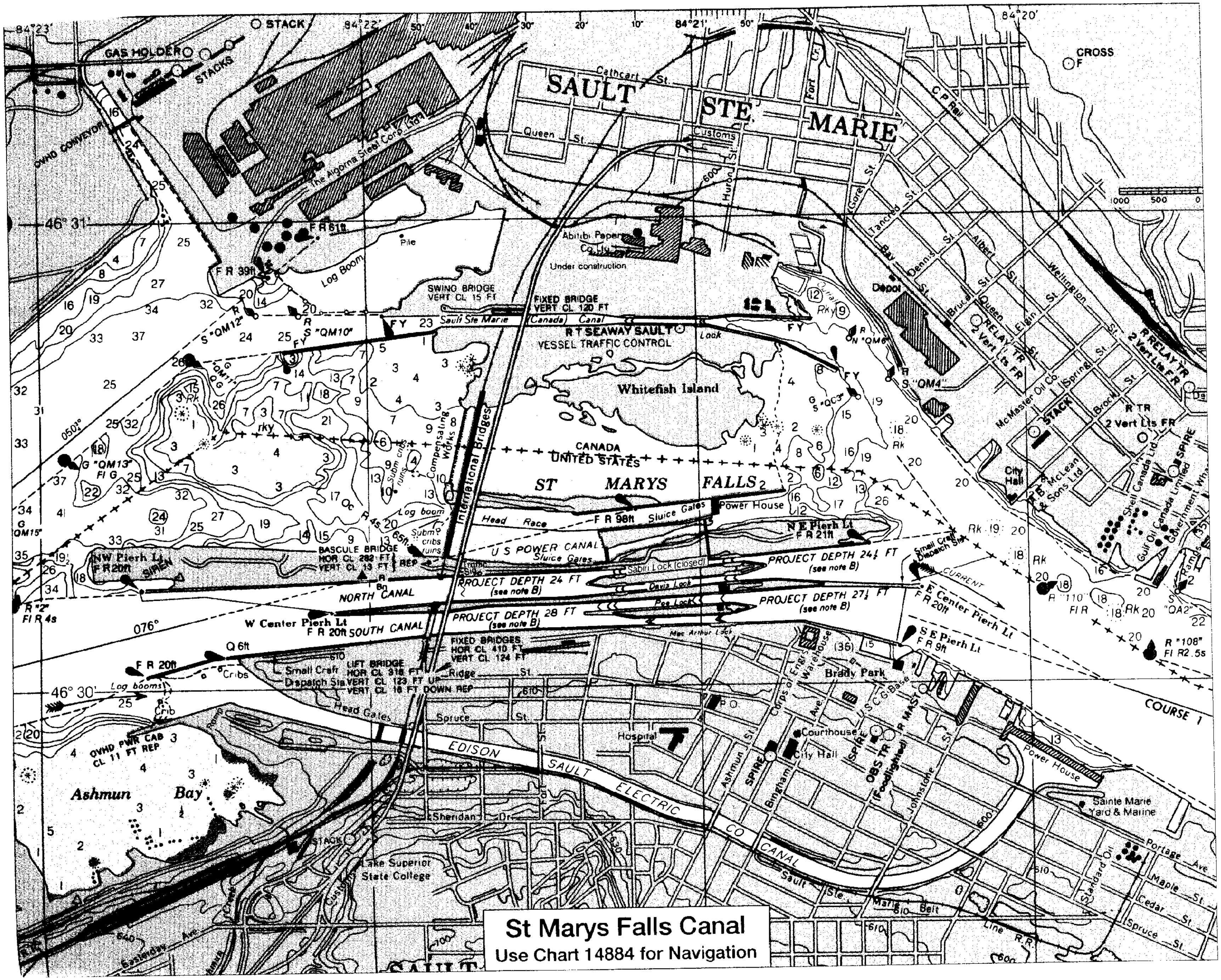
(85) **Chart 14884.**–At the upper end of Course 2, Course 1, **Bayfield Channel,** turns WNW in the approach to St. Marys Falls Canal. The channel has a depth of 28 feet W to the outer end of East Center Pier of the canal and is marked at the lower end by a **109°** lighted range. **Bayfield Dike,** marked by a light, parallels the N channel limit about 1 mile NW of Mission Point. W of the dike, the N channel limit is marked by lighted buoys.

(86) **St. Marys Falls,** the rapids of St. Marys River, are about 14 miles below the head of the river at Point Iroquois and about 3 miles above Mission Point. The rapids are about 0.8 mile long and 0.3 mile wide, with a fall of 18 to 24 feet depending on the varying water stages. The U.S. Government has constructed canals and locks to overcome these rapids.

(87) **St. Marys Falls Canal,** 1.9 miles long between the upper and lower entrances, is along the S side of St. Marys River abreast the falls. The canal comprises North Canal and South Canal, separated by a center pier and each having two locks. The canals are faced with revetment walls and piers of timber, steel, and concrete.

## St. Marys Falls Canal

## St. Marys Falls Canal (II)




St Marys Falls Canal
Use Chart 14884 for Navigation

The outer ends of the N, S, and center piers at the canal entrances are marked by lights. The downbound approach to the canal is marked by a **076°** lighted range.

(88) **South Canal,** with a least width of 304 feet, has a depth of 27½ feet in the E entrance and 28 feet in the W entrance. **MacArthur Lock,** near the lower end of the canal, is 800 feet long, 80 feet wide, and has a depth of 31 feet. **Poe Lock,** immediately N of MacArthur Lock, is 1,200 feet long, 110 feet wide, and has a depth of 32 feet. In September 1988, the controlling depth in the W approach to MacArthur Lock was 28 feet.

(89) **North Canal,** with a least width of 282 feet, is limited by the locks to a depth of 23.1 feet. **Davis Lock,** N of Poe Lock, is 1,350 feet long, 80 feet wide, and has a depth of 23.1 feet. **Sabin Lock,** paralleling the N side of Davis Lock, has the same dimensions. Sabin Lock is not used for cargo carrier vessel transits. Only small vessels such as tugs may transit the lock.

(90) **Communications.**–The chief lockmaster operates a vessel dispatch station from the administration building on the pier between Poe and MacArthur Locks. The station operates on VHF-FM channels 14 and 16; call sign, WUE-21. The voice call for the station is WUE-21 or Soo Locks. Upbound vessels intending to transit the locks shall contact the lockmaster initially immediately before the turn at Mission Point, at the intersection of Course 1, Bayfield Channel and Course 2, Little Rapids Cut for lock assignment. Downbound vessels shall make initial contact at Ile Parisienne, then at Big Point for lock assignment. In order that the dispatch made will cause the least delay to the vessel involved, vessel masters are requested to refrain from making their dispatch calls prior to reaching the above locations. This station is considered to have an effective operating range of about 50 miles. Operation is limited to communication with vessels on matters related to canal operation, traffic movement through the locks, and for emergency purposes. Masters are urged to provide supervision of the vessel's radiotelephone when approaching and transiting the canals so as to be promptly advised of changes in lock dispatch, impending bridge closures, etc. Vessels requiring special services while in the locks should contact the station in advance to expedite necessary arrangements by canal authorities.

(91) **Lock signals.**–Upbound signals consisting of two lights, one red and one green, facing E, are on the SE wall ends of each lock to indicate to upbound vessels when it is safe to proceed into lock chambers. These signals are normally set to show red and are changed to green only when it is safe and permissible for each individual vessel to enter the lock. Vessel masters are cautioned not to enter a lock chamber upbound except on a green light signal, even though the lock gates may be open.

(92) In order that masters of downbound vessels approaching the NW pier may know when either the Davis or the Sabin Lock is filling, three signals have been established. These consist of flashing yellow lights, one placed on top of a light pole at the end of the upper nose pier between these two locks, the second at a point about 100 feet upstream of the railroad bridge on the NW pier, and the third on top of a light pole about midway between the railroad bridge and the end of the NW pier. The lights flash during the first 8 minutes of each lock filling, which is the period when flow toward the lock is increasing. In order that masters of downbound vessels approaching the SW or W center piers may know when either the MacArthur or the Poe Lock is filling, a signal consisting of a flashing yellow light is mounted on the top of a light pole at the end of the nose pier between the MacArthur and Poe Locks. The light flashes during the period when either lock is filling.

(93) Upbound vessels approaching the E center pier are cautioned against landing too close to its outer end because of eddy currents. When the N locks are being emptied, an eddy moving upstream is formed along the SE pier. When the S locks are being emptied, the current at the end of the center pier flows N. When the N locks are emptying, this latter current is usually reversed. Wind conditions alter the situation.

(94) A current sets across the end of the W center pier during the filling of the locks. The current can set in either direction depending on conditions. Vessels bound for Davis Lock should not attempt to make the pier near its end.

(95) Downbound vessels dispatched to MacArthur Lock are cautioned to hold on Vidal Shoals Channel Range until N of the light on SW pierhead. Due to the strong current that sets into the power company canal adjacent to the end of the SW pier, such vessels should pass at least 200 feet N of the end of the pier. A light is about 1,000 feet E of the outer end of SW pier; vessels should land E of the light.

(96) **Caution.**–Downbound vessels approaching MacArthur and Poe Locks may encounter a northerly current, especially near the end of W center pier. Downbound vessels approaching Poe Lock should land downstream of the end of W center pier.

(97) Before entering a lock, all vessels shall put heaving lines, attached to forward and aft cables, out onto the approach pier, and either line or cable shall be continuously carried by the vessel deckhands or canal linesmen until the vessel is moored in the lock chamber in all cases where the mooring is made on the side of the lock adjacent to the approach pier used. Vessels intending to moor on the side of the lock opposite that adjacent to the approach pier shall, in the same manner, put out heaving lines and have the line or cable continuously carried along the approach pier, shall take them in just as the lock is entered, and put them out again on the mooring side of the lock as soon as possible.

(98) All saltwater vessels without bow or stern thrusters requesting lockage are required to be assisted by one or more tugs of sufficient power to ensure full control at all times. Tug assist is also required for all other self-powered vessels which experience severe control problems at low speeds and within close quarters, such as the lock approach channels.

(99) Bow and /or stern thruster use shall be kept to a minimum while transiting the Locks. Thrusters shall not be used while the thrusters are opposite lock gates. They may be used sparingly for short duration within the lock to maintain the ship position near the mooring wall or in an emergency. Thrusters shall be at zero thrust during the period the ship is stopped and moored to the wall with all lines out, and during raising and lowering of pool levels within the chamber.

(100) Vessels leaving the MacArthur Lock and Poe Lock at approximately the same time, the following policy will apply:

(101) 1. The first vessel to leave will be the vessel in the lock which is ready for vessel release first. The vessel in the other lock will be restrained by the gates remaining closed and the wire rope fender remaining in the down position.

(102) 2. On downbound passages, the vessel retained shall not leave the lock until such time as the bow of the vessel leaving first reaches the end of E center pier.

(103) 3. On upbound passages, the vessel retained shall not leave the lock until such time as the bow of the vessel leaving first reaches the railroad bridge.

(104) 4. When a 1,000-foot vessel is ready to depart the Poe Lock and a vessel in the MacArthur Lock leaves first, the 1,000-foot vessel may start to leave once the bow of the other vessel reaches the end of the respective nose pier.

(105) 5. The above policy may be varied on a case by case basis at the direction of the Chief Lockmaster on duty.

(106) 6. Vessel will remain in radio contact with each other and the Chief Lockmaster at all times until clear of the lock area.

(107) **Regulations.**–The use, administration, and navigation of St. Marys Falls Canal and locks are under the direction of the District Engineer, U.S. Army Corps of Engineers, Detroit District. (See **33 CFR 207.440 and 207.441,** chapter 2, for regulations.) Copies of the regulations and the vessel transit forms required in **207.440(k)** are available at the U.S. Canal Office in the operations building adjacent to Davis Lock. A notary public and a **marine post office,** designated Canal Station, are in the operations building.

(108) Upbound recreational small craft desiring lockage shall report to the small-craft dispatch station near the outer end of E center pier. Downbound recreational craft shall report to the dispatch station on SW pier. Rowboats and canoes are prohibited. All craft must have power and an auxiliary movement source such as oars, a life jacket for each person on board, 75 feet of line to reach the top of the lock wall, and lock report forms available at the dispatch station.

(109) Whenever, in the opinion of the Detroit District Engineer or his authorized representatives at St. Marys Falls Canal, the safety of lock structures or vessels in the canal area might be jeopardized by the continuance of vessel movements during periods of low visibility, all vessel movements in the canal area, and in approaching and entering the canal area, may be stopped. Whenever the stopping of vessel movements becomes advisable, the U.S. Coast Guard will be informed and will take such usual action as is necessary to advise vessels approaching St. Marys Falls Canal and to direct their anchoring. The chief lockmaster in the control tower at St. Marys Falls will personally direct, by radiotelephone, all movements of vessels in the locks area at the time the stop order is issued, and may approve continued movement or order mooring at specified locations.

(110) **Sault Ste. Marie (Canada) Canal** is on the N side of St. Marys River parallel to St. Marys Falls Canal. (See **Canadian Sailing Directions,–Great Lakes, Volume II, Chapter 12, St. Marys River**, for additional Information.)

(111) **Bridges.**–Two bridges cross the St. Marys Falls and Sault Ste. Marie Canals W of the locks, from Sault Ste. Marie, Mich. to Sault St. Marie, Ont. The International Highway Bridge has 3 fixed spans, with clearances of 124 feet over South Canal and North Canal, and 120 feet over the Canadian canal.

(112) International Railway Bridge parallels the highway bridge close upstream. Across South Canal, the bridge has a vertical lift span with a clearance of 16 feet down and 123 feet up. Across North Canal, the bridge has a double-leaf bascule span with a clearance of 13 feet. The leaves of the bridge do not open to a vertical position. When open, the S leaf overhangs the channel above a height of about 65 feet above normal water level, and the N leaf overhangs the channel above a height of about 68 feet above normal water level. The vertical lift and bascule spans are each equipped with signal lights that show green when the span is completely open and red at all other times. (See **33 CFR 117.1 through 117.59 and 117.653,** chapter 2, for drawbridge regulations.) Across the Canadian canal, the bridge has a swing span with a clearance of 15 feet. The opening signal for the bridge is three long blasts. The bridge sounds no signals, but shows a green light when open and a red light when closed.

(113) **Sault Ste. Marie, Mich.,** a city on the S side of St. Marys River adjacent to St. Marys Falls Canal, is a **customs port of entry.**

(114) **Weather, Sault Ste. Marie and vicinity.**–Sault Ste. Marie, MI, is located in the extreme northeastern portion of the upper peninsula between Lake Nicolet and Whitefish Bay. Lake Nicolet, along with Munuscong Lake to the south, connect Lake Huron with Lake Superior. Whitefish Bay is the extreme eastern end of Lake Superior. The location averages only one day each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 76°F (24.4°C) and an average minimum of 52°F (11.1°C). January is the coolest month with an average high of 22°F (-5.6°C) and an average minimum of 5°F (-15°C). The highest temperature on record for Sault Ste Marie is 98°F (36.7°C) recorded in August 1947 and the lowest temperature on record is -36°F (-37.8°C) recorded in January 1982. About 180 days each year experience temperatures below 32°F (0°C) and an average 46 days each year records temperatures below 5°F (-15°C). Every month has seen temperatures at or below 40°F (4.4°C) and every month except July (extreme minimum of 36°F (2.2°C), 1992) has recorded temperatures below freezing (0°C).

(115) The average annual precipitation for Sault Ste. Marie is 33.35 inches (847 mm). An annual maximum occurs during the summer, due mainly to convective activity, and a marked dry period occurs during the winter months. Precipitation falls on about 231 days each year. The wettest month is September with 3.75 inches (95.3 mm) and the driest, February, averages only 1.56 inches (39.6 mm). An average of 28 thunderstorm days occur each year with June, July and August being the most likely months. Snow falls on about 125 days each year and averages about 119 inches (3023 mm) each year. December and January each average over 30 inches (762 mm) per year and each month, November through March, each average great than one foot (305 mm). Nearly 27 inches (686 mm) of snow fell in one 24-hour period during December 1995 and snowfall amounts of greater than one foot (305 mm) in 24-hours have fallen in each month December through March. About 26 days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June, July, and August. Fog is present on average 149 days each year and is more prevalent during the late summer and early autumn.

(116) The prevailing wind direction in Sault Ste. Marie is the northwest. Spring is the windiest period but a maximum gust of 62 knots occurred in November 1975.

(117) (See page T-14 for **Sault Ste. Marie climatological table.**)

(118) **Towage.**–Tugs to 2,250 hp are available at Sault Ste. Marie and operate throughout the river. Arrangements are made through Seaway Towing Company's dispatch office in Sault Ste. Marie at 906-632-8801, 906-635-1394 or 906-297-5111, or Great Lakes Towing Company's dispatch office in Cleveland at 800-321-3663 or via remote VHF-FM antenna.

(119) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(120) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(121) **Coast Guard.**–Sault Ste. Marie Coast Guard Station. Group Office, and Base are close S of the lower entrance to South Canal. A **Captain of the Port** office is at the base. (See appendix for address.)

(122) Communications to the Coast Guard relating to distress and/or communications other than vessel traffic movement are made on VHF-FM channels 16 and 22; voice call, Coast Guard Group Sault Ste. Marie.

(123) **Repairs.**–An 800-ton floating drydock with a length of 110 feet, width of 40 feet, and 14½ feet over the sills is 2,000 feet SSW of Bayfield Dike Light. The yard is equipped with a 25-ton floating crane and a 40-ton shore crane. Hull and engine repairs are available. Above-the-waterline repairs are available at another yard 2,000 feet NW. A 100-ton crane is available.

(124) **Sault Ste. Marie, Ont.,** is a port city and manufacturing center on the N side of St. Marys River adjacent to Sault Ste. Marie (Canada) Canal.

(125) The following is extracted (partial) from **Canadian Sailing Directions-Great Lakes, Volume II, Chapter 12, St. Marys River**. It is to be noted that the units of miles are nautical miles.

(126) *The city of **Sault Ste. Marie (Ontario)** had a population of 78,568 in 1988. It has several manufacturing industries. Principal imports are coal, iron ore, iron ore concentrates, limestone and petroleum products. Exports are plate and sheet steel, pig iron, primary iron, steel, paper and forest products.*

(127) ***Customs.**–Sault Ste. Marie is a vessel clearing station for commercial vessels and a vessel reporting station for pleasure craft. The main customs office is at 125 Huron Street. A bonded warehouse of Soo Van and Storage* is at 440 Bay Street.

(128) ***Rescue auxiliary.**–Canadian Marine Rescue Auxiliary vessels are based at Sault Ste. Marie during the boating season.*

(129) ***Communications.**–A Canadian Coast Guard marine radio station, call sign VBB, is in Sault Ste. Marie (details are given in Radio Aids to Marine Navigation, Atlantic and Great Lakes).*

(130) ***Towing facilities.**–Tugs are available.*

(131) ***Transportation.**–The city has passenger, freight and express service and a transcontinental bus service. Sault Ste. Marie Airport, about 20 km west of the city, is operated by the Department of Transport.*

(132) ***Harbour limits.**–The harbour is a Public Harbour administered by the Department of Transport. The harbour limits are defined as all the waters of the St. Marys River north of the International Boundary, west of a line drawn due south from the extremity of **Partridge Point** (46°31′N., 84°14′W.), and east of a line drawn south from Pointe aux Pins lighthouse.*

(133) ***Eastern wharves.**–The Public wharf is 0.8 mile SE of the SE entrance pier to the Sault Ste. Marie (Canada) Canal. It is a concrete structure extending 600 feet (183 m) SW from shore with an L-end extending 310 feet (94 m) NW. There are freight sheds and an oil pipeline on the wharf.*

(134) *There is a triangular-shaped basin on the west side of the Public wharf. The basin entrance is about 70 feet (21 m) wide with depths of 13 to 17 feet (4 to 5.2 m). In 1984 there were depths of 15 to 20 feet (4.6 to 6.1 m) along the east face of the wharf and depths of 20 to 24 feet (6.1 to 7.3 m) along the outer face of the L-end. The inner face of the L-end had depths of 12 to 14 feet (3.7 to 4.3 m) and the west face 5 to 14 feet (1.5 to 4.3 m). The basin had depths of 12 to 17 feet (3.7 to 5.2 m) except at the north end which was shallower.*

(135) *The Shell Oil Company wharf is about 0.1 mile west of the Public wharf.*

(136) ***Western wharves.**–The wharves and slip of the Algoma Steel Corporation Ltd. are close north of the west entrance to the Canadian canal. An irregular-shaped wharf area with steel sheeting faces lies 0.2 mile NW of the outer end of the lock approach to the SW pier. The SE face of this wharf is 490 feet (149 m) long, the SW face is 355 feet (108 m) long, and the NW face is 200 feet (61 m) long. The wharf has an elevation of 6 feet (1.8 m). Steel is loaded here.*

(137) *A slip 1,800 feet (549 m) long and 240 to 150 feet (73 to 46 m) wide is entered 0.15 mile NW of the above-mentioned wharf area. A continuous concrete wharf face with an elevation of about 6 feet (1.8 m) extends from the irregular-shaped wharf and continues along the NE side of the slip. Coal and iron ore are unloaded at these berths. Three mobile ore bridges operate along this side of the slip.*

(138) *On the SW side close inside the entrance to the slip there is a wharf face 400 feet (122 m) long with a deck elevation of 7 feet (2.1 m). Self-unloading vessels discharge limestone and gypsum at this berth.*

(139) ***Overhead conveyor.**–An overhead coal conveyor with a vertical clearance of 125 feet (38 m) spans the Algoma Steel Corporation slip a little less than 0.2 mile from the entrance.*

(140) **Charts 14962, 14884.**–From the St. Marys Falls and Sault Ste. Marie Canals, the upper part of St. Marys River leads SW around Pointe aux Pins, thence NW to its head in the deep water of Whitefish Bay. The dredged channels through this part of the river are well marked by lighted and unlighted buoys and lighted ranges.

(141) **Vidal Shoals** are in the upper approaches to the United States and Canadian canals. Dredged channels lead through the shoals to the respective canals.

(142) **Vidal Shoals Channel,** the approach to St. Marys Falls Canal, with a depth of 28 feet, leads ENE from **Big Point** for 2.2 miles to the canal entrance. The channel is marked by **076°** Vidal Shoals Channel Range.

(143) A privately dredged 21-foot channel leads S from Vidal Shoals Channel to a slip at the C. Reiss Coal Co. 1.7 miles WSW of Poe Lock. In 1966, the slip had a controlling depth of 21 feet for a distance of 600 feet. In 1978, the dock was in poor repair.

(144) **Pointe aux Pins Course,** with a depth of 28 feet, extends from Big Point SW for 2.5 miles to the turn between **Brush Point, MI,** and **Pointe aux Pins, Ont.,** (46°28.5′N., 84°27.9′W.). The channel is marked at the upper end by a **233°** lighted range.

(145) **Pointe Louise Channel** leads SSW for 0.8 mile from Pointe aux Pins to **Pointe Louise,** and thence **Pointe Louise Turn** leads SW for 0.5 mile to connect with Brush Point Course. These channels have a depth of 28 feet.

(146) **Brush Point Course** extends from Pointe Louise Turn SW for 3 miles to the turn SSW of **Pointe des Chenes, Ont.** (46°28.6′N., 84°31.6′W.). The channel has a depth of 28 feet and is marked at the lower end by a **074°** lighted range.

(147) At the turn at the upper end of Brush Point Course the dredged channel flares broadly to W. **Birch Point Course** leads NW from the turn for about 4 miles to the deep water in Whitefish Bay and includes dredged cuts through Point Iroquois Shoals and Gros Cap Reefs, Ont. The channel has a depth of 30 feet and is marked at the lower end by a **138°30′** lighted range on **Birch Point** (46°26.0′N., 84°31.4′W.). A lighted midchannel buoy is on the range line in the turn.

(148) **Waiska Bay, MI,** 3 miles W of Birch Point, has depths of 4 to 12 feet and is used mainly by local fishermen. Submerged and partially submerged piles extend in a line across the mouth of the bay, and extreme caution is advised when entering the bay.

(149) A small-craft facility is at the N end of Waiska Bay; fuel and repairs are available. In October 1987, a reported controlling depth of 2 feet was available in the approaches to the facility.

(150) **Point Iroquois Shoals,** with a depth of 15 feet at the outer edge, extend from the shoreline SE of **Point Iroquois, MI** (46°29.1′N., 84°37.8′W.) NE to the edge of the dredged channel

through Birch Point Course. Buoys at the outer edge of the shoal mark the limit of the dredged channel.

(151) A buoy 2.9 miles NW of Point Iroquois marks the NE side of a boulder bank covered 24 feet.

(152) **Gros Cap, Ont.** (46°32′N., 84°35′W.), the NE entrance point to the St. Marys River, has radio masts with air obstruction lights nearby.

(153) **Public wharf.**–A 236-foot breakwater-wharf is close SE of Gros Cap.

(154) **Customs.**–Gros Cap is a vessel reporting station for pleasure craft.

(155) **Gros Cap Reefs**, a rocky bank with a least depth of 17 feet, is on the E side of the entrance to St. Marys River, 2 miles N of Point Iroquois and from 1 to 1.8 miles SW of Gros Cap.

(156) **Gros Cap Reefs Light, Ont.** (46°30.7′N., 84°36.9′W.), 45 feet above the water, is shown from a white tower on the S part of the reefs. A Racon is at the light.

# 13. LAKE SUPERIOR

(1) **Chart Datum, Lake Superior.**–Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Superior is an elevation 601.1 feet (183.2 meters) above mean water level at Rimouski, Quebec, on International Great Lake Datum 1985 (IGLD 1985). (See Chart Datum, Great Lakes System, indexed as such, chapter 1.)

**Dimensions, etc.**

(2) Length, steamer track, Duluth Ship Canal to Point Iroquois; about 383 miles.

(3) Length (right line in clear), Duluth Ship Canal to Michipicoten Harbour; 350 miles.

(4) Breadth, on about longitude 86°45'W.; 160 miles.

(5) Depth, maximum recorded; 1,333 feet.

(6) Water surface of lake (including St. Marys River above Brush Point); 20,600 square miles (U.S.), 11,100 square miles (Canada).

(7) Entire drainage basin (including St. Marys River above Brush Point); 37,500 square miles (U.S.), 43,500 square miles (Canada).

(8) **General description.–Lake Superior**, the largest freshwater lake in the world, is the northernmost, westernmost, highest, and deepest of the five Great Lakes. The lake is fed by the waters of many short swift-flowing streams and drains through the St. Marys River into Lake Huron. The shores of the lake are generally high, rocky, and forested. The lake is sparsely populated, especially along the N shore.

(9) The waters of Lake Superior are colder and form more shore ice than do the other lakes. The navigation season, shorter than the other lakes, is generally about 8 months long. The actual length of the season depends primarily on whether tonnage demands justify the expense of ice breaking for earlier or later vessel movements. Commercial fishing operations from harbors around the lake continue throughout the year except where prevented by ice conditions.

(10) **Fluctuations of water level.**–The normal elevation of the ake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and all; the lowest stage is usually reached at about the close of winter nd the highest during the late summer.

(11) In addition to the normal seasonal fluctuation, oscillations of irregular amount and duration are also produced by storms. Vinds and barometric pressure changes that accompany squalls an produce fluctuations that last at the most a few hours. A storm f this type in 1939 produced fluctuations at Marquette with a aximum range of 7.4 feet. At other times, strong winds of susined speed and direction can produce fluctuations that last a few ours or a day. These winds drive forward a greater volume of surace water than can be carried off by the lower return currents, us raising the water level on the lee shore and lowering it on the indward shore. Fluctuations caused by such winds seldom xceed 1 foot above or below the normal level, but may cause hanges up to 2 feet. An unusually severe storm in 1905 temporarily raised the water level in Duluth by 2.3 feet.

(12) Through an agreement between the United States and Canada, the water level of Lake Superior is controlled by means of compensating works in St. Marys River. The dikes and sluice gates in the river are operated so as to maintain the monthly mean level of Lake Superior as nearly as possible between elevations 599.61 feet (182.76 meters) and 603.22 feet (183.86 meters) abovethe mean water level at Rimouski, Quebec, on International Great Lakes Datum1985 (IGLD 1985).

(13) **Weather, Lake Superior.**–Strong winds are a threat from fall through spring over the open waters. Late autumn is the worst, when gales blow up to 6 percent of the time. The W part of the lake is least susceptible since it is somewhat sheltered from the strong winds, many of which have a westerly or northerly component. Fall windspeeds of 28 knots or more occur 11 percent of the time in this region compared to 16 to 18 percent elsewhere.

(14) Spring winds are variable, with N through SE winds common in the morning; southwesterlies also appear in the W. Afternoon directions are similar, with the addition of northwesterlies in the E. Gale frequencies drop to 2 percent or less by May; however, some of the highest winds of the year are encountered during this season. Along the shore, it is a volatile time. At many locations, April registers the highest mean windspeed of the year, while speeds of 28 knots or more also reach a peak. At Duluth, they blow up to 3 percent of the time in April, a month in which its highest windspeed of 65 knots (NE) was recorded. Marquette recorded a 79-knot wind during a May thunderstorm. Winds with easterly components are common in the morning; this is most noticeable at Duluth and Sault Ste. Marie. At Marquette northerlies prevail. Afternoon winds often have a westerly component, but northerlies and southerlies are frequent too.

(15) Summer winds are often out of the S through W; this pattern is intruded upon by afternoon northwesterlies in the E. Windspeeds are most often in the 10- to 20-knot range with gales and near gales uncommon. Strong winds are usually associated with occasional thunderstorms. In fact, the highest recorded wind on the lake was 81 knots (northwesterly) in a June thunderstorm. Along the shore the lake-land breeze results in offshore components in the morning reversing themselves during the day. Morning easterlies give way to W through NW winds at Sault Ste. Marie. Marquette's light and variable breezes yield to a N-through-NE flow.

(16) As autumn progresses, winds blow more and more out of the W and N, and windspeeds are on the increase. By October, gales are blowing up to 5 percent of the time in the east and 2 to 4 percent of the time in the W. Onshore, similar changes are occurring. Early autumn onshore-offshore flow gives way to a variety of S through NW winds associated with migratory highs and lows. Speeds of 28 knots or more, while not frequent, are more so than in summer. Sault Ste. Marie recorded a 62-knot northwesterly during November. Winter winds are stronger still and remain mostly out of the S through NW with an increase in northerlies.

(17) Thunderstorms can occur at any time, but they are most likely from April through October, particularly during June, July, and August. Over the open waters, thunderstorms are encountered 1 to 3 percent of the time during the summer months. These thunderstorms are by far most likely in the early morning hours between midnight and 0300 l.s.t.; they occur up to 8 percent of the

time during these hours. Minimum activity occurs around midday. The W half of the lake is more vulnerable to thunderstorms than the E half.

(18) Along the shore, thunderstorms occur on 20 to 30 days annually, including 4 to 7 days per month in the summer. Activity is slightly more frequent at Duluth than at other locations. These thunderstorms can occur as isolated single cells or in violent squall lines. They can generate strong gusty winds and hail. On occasion, tornadoes or waterspouts have been associated with these squalls. Winds in thunderstorms have been recorded at around 80 knots; strong winds are most likely in spring and early summer.

(19) The lake is large enough for strong winds from any direction to have sufficient fetch to build up a sea. However, the Keweenaw Peninsula tends to diminish seas generated by easterlies and westerlies in the S part of the lake. Elsewhere, seas of 25 to 30 feet (8 to 9 m) have been encountered.

(20) In spring, seas can be rough but become less so as summer approaches. Waves of 5 feet (1.5 m) or more encountered 30 to 40 percent in April drop off 10 to 15 percent by May. Seas of 10 feet (3 m) or more also crop up less frequently. An even more dramatic calming occurs in June.

(21) Summer seas rarely build to 10 feet (3 m) or more, 1 percent of the time, and reach 5 to 10 feet (1.5 to 3 m) about 10 to 15 percent of the time. Thunderstorms can quickly build rough, choppy seas, but the large waves generated when strong winds blow over a long fetch of water are unusual. Wave heights are 2 feet (0.6 m) or less about 60 to 70 percent of the time. Rough conditions return in force during autumn.

(22) Seas of 5 feet (1.5 m) or more can be expected 20 to 30 percent of the time in September; by November these figures increase by 20 percent. By late fall, seas are running 10 feet (3 m) or more about 5 to 10 percent of the time, more than double earlier chances. W waters are the least vulnerable, while central and E waters are more susceptible to the strong winds with northerly and westerly components.

(23) Poor visibilities can be encountered during any season. Radiation fog in autumn, ice fog in winter, and advection fog from spring through fall all contribute to restricted visibilities, as do rain and snow.

(24) Over the open waters, April through August and December are the fog-prone months during the navigation season; June and July are the worst. During this 2-month stretch, visibilities of 2 statute miles (1.7 nm) or less may be encountered about 10 to 20 percent of the time, while they fall to 0.5 statute mile (0.4 nm) or less about 8 to 17 percent of the time. The most vulnerable waters lie between Keweenaw Point and Au Sable Point. While there is a greater tendency towards fog in the early morning hours, it is not as pronounced as it is onshore.

(25) Along the shore, fog is mainly a morning phenomenon, particularly dense fog. While there are seasonal variations, poor visibilities are common throughout the year. They drop to 0.5 statute mile (0.4 nm) or less on about 40 to 60 days annually. At a peak these conditions can be expected on about 6 to 7 days per month. This peak occurs during the summer at some locations with advection fog drifting onshore. Marquette experiences this type of fog. When cold air moves across warm water, fog can set in; this happens at Sault Ste. Marie in late summer and autumn. Radiation fog is also a fall problem, but usually lifts by early afternoon. At Duluth, industrial smoke adds to the visibility hazard.

(26) **Ice.**–The large heat-storage capacity of Lake Superior plus the strong winds, waves, and currents which create a continuing overturning of relatively warm, deep water inhibit an early ice cover.

(27) Whitefish Bay, at the lower end of Lake Superior, is a bottleneck area. The shallow bay forms ice rapidly, and the prevailing W winds jam and pack the lake ice into the area. The ice reaches an average thickness of 14 inches and an average maximum thickness of 22 inches. Windrows are at least 4 feet thick in most winters, and thicknesses of 8 to 9 feet may be reached.

(28) In the N part of Lake Superior, ice begins to form along the shore in late January and early December, but because of the nature of the shoreline, significant fast ice develops only in Nipigon Bay and Black Bay. Through January and early February the lake remains open, with drifting patches of slush and new ice. By late February these patches may extend 40 to 50 miles into the lake from the lee shores and may reach a 70 to 90 percent coverage of medium thickness ice. Some open water is always present in midlake. The drifting ice decays through March and reaches open water by the end of the month. After reaching a thickness of 30 to 35 inches, the fast ice along the shore breaks up by mid-April.

(29) In the W end of Lake Superior, fast ice about 4 to 6 inches thick builds NE from Duluth as far as the Apostle Islands. In navigation areas, ridging and rafting of the ice occurs, and the refrozen brash ice may reach a thickness of 4 feet. The lake may briefly become covered 80 to 90 percent, but strong winds and the associated waves generally compact the thinner ice and stir up warm water, thus reducing the ice coverage to 40 to 50 percent, even in a severe winter.

(30) Fast ice forms in practically all harbors, entrance channels, and bays. In Thunder Bay, the ice reaches an average thickness of 20 to 30 inches through January, February, and March. At Duluth-Superior, ice up to 1 foot thick can form in December depending on the severity of the winter; the average range is 3 to 6 inches. Ice in the harbor reaches an average maximum of 27 inches and, depending on the weather, is in a state of deterioration by mid-April. (See Winter Navigation, chapter 3.)

(31) **Local magnetic disturbances.**–Local magnetic disturbances are more prevalent on Lake Superior than on the other Great Lakes. Reports from vessel masters show that the strongest disturbances are along the N shore of the lake, that they decrease in intensity as the distance from this shore increases, and that the tendency is for upbound vessels to be drawn toward the N shore. The disturbances are described in this chapter with the discussion of their locale.

(32) The directive force of the earth's magnetism is rather weak in this region as compared with other navigable waters of the world, and this tends to make the compass needle rather sluggish. Vessel masters should give proper attention to the correction of the compass and the determination of the ship's deviation.

(33) **Routes.**–The Lake Carriers' Association and the Canadian Shipowners Association have recommended, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Superior:

(34) Downbound vessels shall lay a course of **063°** for 72 miles from Duluth Ship Canal to pass not less than 12 miles off **Devils Island Light**; then a course of **078°** for 123.25 miles to pass not less than 12 miles off **Eagle Harbor Light**; thence **086°** for 14 miles to pass not less than 12 miles off **Copper Harbor Light**; thence **105°** for 18.25 miles to pass not less than 12 miles off **Manitou Light**; thence **114°** for 131.5 miles to pass not less than 2.5 miles off **Whitefish Point Light**; thence **148°** for 14.75 miles to a point 2.5 miles off **Ile Parisienne Light**; and thence **139°** for 9.75 miles to off **Gros Cap Reefs Light**; Provided, that vessels leaving Superior Harbor shall lay their course of **045°** for 19.75 miles before turning on their course for Devils Island.

(35) Downbound vessels from Two Harbors shall lay a course of **068°** for 47 miles to a position not less than 12 miles off Devils Island, then join the general downbound course.

(36) Downbound vessels from Taconite Harbor shall steer **088°** for 129.5 miles to a point not less than 12 miles N of Eagle Harbor and there join the general downbound course.

(37) Downbound vessels from Silver Bay shall steer **080°** for 147 miles to a point 12 miles N of Eagle Harbor and there join the general downbound course.

(38) Downbound vessels from Ashland shall lay a course of **062°** for 133.75 miles from South Channel to intersect the downbound course from Duluth 12 miles N of Eagle Harbor Light.

(39) Downbound vessels from Marquette shall take departure from a point **076°**, 2 miles from **Presque Isle Harbor Breakwater Light** and shall lay a course of **076°** for 60.25 miles to pass not less than 7 miles off **Au Sable Light**; then a course of **083°** for 48.75 miles to pass not less than 7 miles off the abandoned lighthouse at Crisp Point and continue for 5.25 miles until intersecting the downbound course from Manitou to Whitefish Point. The foregoing may be accomplished from Marquette by steering **034°** for 3.75 miles to the above point of departure, then laying the **076°** course.

(40) Downbound vessels from Thunder Bay, Kaministiquia River entrance, shall take departure from a point not more than 0.5 mile **047°** from Welcome Island Light and shall lay a course of **137°** for 9.25 miles to a position not less than 2.5 miles **227°** from Thunder Cape.

(41) From Mission River Entrance, vessels shall take a departure from the Entrance Breakwater Light, and shall lay a course of **110°** for 2.5 miles; thence **118°** for 8.75 miles to a position not less than 2.5 miles **227°** from Thunder Cape.

(42) Vessels shall now lay a course of **098°** for 26 miles passing not less than 2 miles **187°** off Thunder Cape and passing not less than 1.75 miles **187°** from Trowbridge Island Light in order to pass not more than 2.5 miles off Blake Point Light abeam; thence **121°** for 2 miles to a point not less than 1 mile **211°** from Passage Island Light; thence **148°** for 15 miles; thence **119°** for 175.25 miles to a point not less than 2.5 miles **030°** from Whitefish Point; thence joining the downbound course to Ile Parisienne.

(43) Upbound vessels for the S shore and W Lake Superior points shall lay a course from **Point Iroquois Shoal Lighted Bell Buoy 45**, E of Point Iroquois, **300°** for 5 miles; thence **319°** for 7 miles to a point 4 miles off Ile Parisienne Light; thence **328°** for 14.25 miles to a point 1 mile off Whitefish Point Light; thence lay a course not over **280°** for 14.25 miles to a point not more than 4.5 miles off the abandoned lighthouse at Crisp Point; thence **292°** for 133.25 miles to pass not more than 4 miles off Manitou Light and not more than 5 miles off Cooper Harbor Light; thence **266°** for 14 miles to pass not more than 5 miles off Eagle Harbor Light; thence **258°** for 123.5 miles to pass not more than 5 miles off Devils Island Light; and thence to destination as follows:

(44) **243°** for 67.75 miles to Superior

(45) **248°** for 69.25 miles to Duluth

(46) **258°** for 45 miles to Two Harbors.

(47) Upbound vessels for Taconite Harbor shall follow the general upbound course to a point 5 miles N of Copper Harbor, then steer **270°** for 143.5 miles to destination.

(48) Upbound vessels for Silver Bay shall follow the general upbound course to a point 8 miles N of Outer Island; then steer **279°** for 39 miles to destination.

(49) Upbound vessels for Ashland when 5 miles N of Eagle Harbor Light shall lay a course of **244°** to pass 6.5 miles off **Michigan Island Light**; thence **254°** for 12 miles to South Channel.

(50) Upbound vessels for Marquette shall lay a course of **263°** for 43 miles from a point not over 4.5 miles off the abandoned lighthouse at Crisp Point to pass not more than 4.5 miles off **Au Sable Light**; thence **256°** for 60.5 miles to destination.

(51) Upbound vessels for Thunder Bay shall take departure from a point 0.6 mile **293°** from **Gros Cap Reefs Light**; thence steer **000°** for 1.5 miles; thence head on **Whitefish Point Light** steering **319°** for 8.6 miles to a point 1.5 miles **230°** from **Ile Parisienne Light**; thence **340°** for 13 miles to a point 6 miles **065°** from Whitefish Point Light; thence **300°** for 192 miles to a point not more than 0.5 mile **211°** from Passage Island Light; thence **310°** for 3 miles; thence **277°** for 26 miles, passing not more than 0.75 mile **187°** from Trowbridge Island Light, not more than 1 mile **187°** off Thunder Cape and not more than 0.5 mile **170°** off Hare Island Reef Lighted Buoy A2; thence **319°** for 8 miles to pass not less than 1.25 miles from **Welcome Island Light**; thence to destination.

(52) Vessels bound for Mission River entrance, from the position not more than 0.75 mile **187°** from **Hare Island Reef Lighted Buoy A2**, shall lay a course of **292°** for 8 miles; thence **290°** for 2.5 miles to destination.

(53) Vessels upbound to other points on the N shore of Lake Superior shall follow the courses as laid down from the Gros Cap Reef Light, to the position 6 miles **065°** from Whitefish Point Light; thence to destination.

(54) It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on chart 14961, Lake Superior.

(55) Limits of anchorage in Whitefish Bay are recommended as follows: From a point on the Birch Point range 0.5 mile above Gros Cap, **340°** for 2.5 miles; thence **314°** to a point 2 miles off Ile Parisienne Light. From a point on the Birch Point range 0.5 mile above Gros Cap, **229°** for 0.5 mile; thence **300°** for 2.7 miles; thence to a point 3.5 miles off Ile Parisienne Light. No downbound vessel to proceed from this anchorage area unless authorized to do so by the U.S. Coast Guard.

(56) **Pilotage.**–The waters of Lake Superior are Great Lakes undesignated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters. Registered pilots for Lake Superior are supplied by Western Great Lakes Pilots Association. (See appendix for addresses.) A pilot exchange point is at the head of St. Marys River about 3.5 miles SE of Point Iroquois. The pilot boat, J. P. IX, docks just above the locks at Sault Ste. Marie. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

(57) **Principal ports.**–Compared with the other Great Lakes, Lake Superior is fairly well provided with natural harbors that provide refuge for vessels. In addition, several harbors have been improved with breakwaters to provide the necessary protection. The most important harbor in U.S. waters in the lake is at Duluth-Superior. This harbor has drydocking facilities for deep-draft vessels.

(58) **Charts 14962, 14884.–Whitefish Bay** is a large deep bay in the SE corner of Lake Superior in the approach to the head of St. Marys River. **Point Iroquois** (46°29.0′N., 84°38.0′W.), marked by an abandoned lighthouse, is on the SE side of the bay on the W side of the entrance to St. Marys River. **Nodoway Point** is 2.2 miles W of Point Iroquois. **Mission Hill** is a prominent 400-foot hill between the points. A rocky ledge, marked on the NE side by a buoy, extends about 2 miles N from Nodoway Point.

(59) From Nodoway Point, the S shore of Whitefish Bay extends 7.5 miles SW to the mouth of **Pendills Creek,** thence NW for 2.7 miles to **Salt Point. Pendills Bay** is the bight formed between the points. Shoals extend about 0.4 mile offshore in the E part of the bay and increase to 1 mile offshore NW of Pendills Creek.

(60) **Chart 14962.**–From Salt Point W for 3.8 miles to Naomikong Point, shoals extend 2 miles from shore, and thence the shoal limit extends NW across the mouth of Tahquamenon Bay. **Naomikong Point**, and **Menekaunee Point** close W, form the S entrance point of **Tahquamenon Bay**, the SW part of Whitefish Bay. A rocky ledge with depths less than 6 feet extends 1 mile N from Naomikong Point, and a 4-foot spot is 0.5 mile E of the point.

(61) **Tahquamenon River** flows into the W side of Whitefish Bay just N of the N entrance point to Tahquamenon Bay. A shoal with depths of 2 feet extends from the mouth of the river S for about 3.5 miles into Tahquamenon Bay. The entrance to the river is shoal and should be approached with care. In 1981, the channel across the bar had a controlling depth of 2 feet. The river is navigable by small boats for about 16 miles. In 1963, the least depth in this stretch was 3 feet. A launching ramp is on the S side of the river mouth. Fuel is available nearby.

(62) From the Tahquamenon River N for 15.5 miles to Whitefish Point, the shoal border decreases in width from 2.7 miles to about 0.2 mile. Ruins of two abandoned docks extend offshore at the mouth of **Shelldrake River,** 8.5 miles N of Tahquamenon River.

(63) **Whitefish Point Harbor,** entirely artificial, is on the NW side of Whitefish Bay about 1 mile SW of the tip of Whitefish Point. The harbor, protected by breakwaters on the N, S, and E sides, serves as a harbor of refuge for shallow-draft vessels.

(64) **Channels.**–The harbor is entered from Whitefish Bay through a dredged channel leading N, then W, between the breakwaters to the S end of the basin. The outer ends of the breakwaters are marked by lights. In July-August 1990, the controlling depth was 12 feet in the entrance channel and basin, except for lesser depths along the edges and a 7½-foot spot off the face of the Browns Fishery pier.

(65) **Small-craft facilities.**–Transient berths for craft to 60 feet, and a launching ramp are available at a facility developed by the Michigan State Waterways Commission at the N end of the basin. Gasoline and water are available at a fishery dock on the W side of the basin.

(66) **Whitefish Point,** on the W side of the entrance to Whitefish Bay, has sandhills and some trees. In 1978, it was reported that the point was a poor radar target. **Whitefish Point Light** (46°46.3′N., 84°57.4′W.), 80 feet above the water, is shown from a white cylindrical tower on the point; a radar beacon (Racon) is at the light.

(67) From Whitefish Point WSW for 20 miles to Little Lake Harbor, the shore is sandy, wooded inshore, and generally bold. Shoals extend about 0.5 mile from shore. None of the rivers which empty into the lake in this stretch are navigable.

(68) An abandoned lighthouse at **Crisp Point** and the buildings at the abandoned Coast Guard station at Vermilion, 4.5 miles E of Crisp Point, are good landmarks.

(69) **Little Lake Harbor,** 20 miles W of Whitefish Point, is the only harbor of refuge in the 49-mile stretch between that point and Grand Marais. **Little Lake,** oval in shape, about 0.5 mile long and 0.3 mile wide, is separated from Lake Superior for most of its length by a low sand ridge and by higher bluffs along the remainder. The lake has depths of 18 feet and more with good water close to shore.

(70) **Channels.**–A dredged channel leads from Lake Superior through a stilling basin between converging breakwaters and thence through the sand ridge into Little Lake. The outer ends of the breakwaters are marked by lights. In June 1992, the controlling depth was 7 feet (8 feet at midchannel) through the entrance and stilling basin to the lake. The channel is subject to extensive shoaling.

(71) Boat operators using the harbor are cautioned to use care in navigating the entrance area, and are advised that storm action may cause additional shoaling.

(72) **Small-craft facilities.**–A T-shaped dock developed by the Michigan State Waterways Commission is on the NE side of Little Lake. In July 1981, depths at the face of the dock were 6 to 7 feet. Transient berths, gasoline, water, and electricity are available. Other services are very limited because of the isolated location of the harbor.

(73) From Little Lake Harbor W for 29 miles to Grand Marais, the shoreline is bold. Shoals extend about 0.5 mile from shore.

(74) **Charts 14962, 14963.–Grand Marais, Mich.,** is a village and small-craft harbor in **West Bay,** 29 miles W of Little Lake Harbor. It is an important harbor of refuge, being the only harbor of any kind along the dangerous 65-mile stretch of shore between Little Lake and Grand Island. West Bay has depths over 18 feet for a length of 1.3 miles and a width of 0.3 mile. The bay is separated from Lake Superior at the W end by a low sand ridge and at the E end by a shallow sandspit. The natural entrance to the bay, across the spit, has been closed by a pile dike. The dike is reinforced with riprap, but in 1981, it was in ruins and was not visible above the water. Numerous submerged piles at the dike are a hazard to any craft.

(75) **Prominent features.**–Prominent are a red brick school and chimney in the village and a white building on the W side of the harbor entrance.

(76) **Grand Marais Harbor of Refuge Outer Light** (46°41.3′N., 85°58.5′W.), 40 feet above the water, is shown from a white square pyramidal skeleton tower, upper part enclosed, on the outer end of the W pier; a fog signal is at the light.

(77) **Channels.**–A dredged entrance channel between parallel piers leads across the sandspit which separates Lake Superior and West Bay. The outer and inner ends of the W pier and the outer end of the E pier are marked by lights. In July 1996, the controlling depth in the channel was 15 feet except for shoaling along the edges.

(78) **Anchorage.**–West Bay has good anchorage in depths of 18 to 40 feet, sand bottom. Sand moving in through breaks in the dike has caused shoaling in the E end of the harbor, so anchorage in the W end is advised.

(79) **Grand Marais Coast Guard Station,** operated on weekends during the boating season, is on the W side of the entrance channel.

(80) **Small-craft facilities.**–A public dock developed by the Michigan State Waterways Commission at the W end of the harbor provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out facilities, and a launching ramp. Arrangements can be made for minor repairs.

(81) From Grand Marais, the shore extends WSW for 7 miles thence NW for 1.7 miles to Au Sable Point. **Grand Sable,** a steel bluff with elevations of 400 feet above the lake, extends from mile W of Grand Marais to within 1 mile of Au Sable Point. Shoals extend 0.2 to 0.4 mile offshore in this stretch.

(82) **Au Sable Light** (46°40.3′N., 86°08.4′W.), 100 feet above the water, is shown from a white conical tower, red dwelling attached, on **Au Sable Point.**

(83) **Local magnetic disturbance.**–A large area of magnetic disturbance has been observed about 40 miles NW of Au Sable Point.

(84) **Chart 14963.**–A shoal with a least depth of 6 feet extends 0.9 mile NW from Au Sable Point.

(85) **Pictured Rocks National Lakeshore** occupies the entire shore from 1.5 miles W of Grand Marais W to Au Sable Point, thence SW for 28 miles to within 2.5 miles of Munising.

(86) From Au Sable Point, the shore extends SW for 17.5 miles to **Grand Portal Point.** The shore for most of this reach is bluff with high points up to 100 feet above the lake close to shore. About 4 miles NE of Grand Portal Point, the shore changes to sheer exposed cliffs over 100 feet high. Except for 23- and 24-foot shoals about 0.5 mile offshore 3 and 4 miles NE of Grand Portal Point, respectively, no outlying obstructions are along this stretch.

(87) **Charts 14963, 14969.**–From Grand Portal Point, the shore trends SW for 9.7 miles to **Sand Point.** The cliffs of Pictured Rocks extend along the first 8 miles of this stretch. **Sail Rock** and **Miners Castle Point,** 1 and 6 miles SW of Grand Portal Point, respectively, are prominent. S of Pictured Rocks, a high wooded bluff continues close to shore past Sand Point. Shoals extend about 0.3 mile offshore in this stretch. About 2.2 miles SW of Miners Castle Point, a shoal with a least depth of ½ foot makes out from shore and extends SW to a point 0.3 mile NW of Sand Point. The shoal is marked by a lighted bell buoy.

(88) **Grand Island,** about 7.5 miles long and 3.5 miles wide, is a high wooded island W of this reach. The N end is 9 miles W of Grand Portal Point, and the SE end is 0.7 mile W of Sand Point. **Grand Island Light** (46°33.7′N., 86°40.9′W.), 190 feet above the water, is shown from a white post on the NW point of the island. Shoals extend about 0.5 mile off the two points at the N end of the island, and a shoal with depths of 2 to 6 feet extends 0.5 mile S and SW from the S point of the island. A buoy marks the SW edge and the S edge of the shoal at the S end of the island. Shoals extend no more than 0.3 mile off the E and W shores of the main body of the island.

(89) The **Thumb,** the SE part of Grand Island, is high and roughly oval in shape, about 3 miles long and 1 mile wide. The Thumb is connected to the SE side of Grand Island by a low narrow neck of land, with bays formed on either side between the Thumb and the island. **Trout Bay** is N of the neck, and **Murray Bay** is S. An abandoned lighthouse is on the SE side of the Thumb.

(90) A shoal with depths of 10 to 18 feet extends 0.6 mile N from **Trout Point,** the N point of the Thumb. A shoal, with a depth of 8 feet at the outer edge and marked by a lighted bell buoy, extends 0.5 mile E from shore just SE of Trout Point. The shoal border for the remainder of the E side of the Thumb is narrow and is marked by a buoy opposite Sand Point.

(91) A narrow deepwater channel leads between the SE side of the Thumb and the shoal off Sand Point to Grand Island Harbor. The shoal is marked on its W edge by a lighted bell buoy; least depth of the shoal is ½ foot. The channel is marked by a 217° lighted range at Munising.

(92) **Grand Island Harbor,** the area of deep water off the S end of Grand Island, is a refuge during N storms for the largest vessels plying the Great Lakes. Anchorage with good holding ground is in the mouth of Murray Bay, between the S point of Grand Island and **Wick Point,** the S point of the Thumb. Avoid the submerged cables that extend from Powell Point to the S end of Grand Island.

(93) **South Bay,** between Sand Point on the E and **Powell Point** on the W, extends 2.5 miles S from Grand Island Harbor. Shoals extend about 0.2 mile from the shores of the bay.

(94) **Munising Harbor** is at the S end of South Bay at the town of **Munising, Mich.** Prominent are the lighted radio masts on the high ground W of the town and the black stack and silver tank at the Kimberly-Clark Corp. on the SE side of the town. A hospital is in the town. A 217° lighted range in the town marks the harbor approach. **Anna River,** which flows into the SE corner of South Bay, is not navigable by even small craft.

(95) **Munising Coast Guard Station,** operated on weekends during the boating season, is in the town of Munising at the front range light.

(96) **Towage.**–Tugs are available from Sault Ste. Marie and Duluth. (See Towage under those ports.)

(97) **Wharf.**–The Munising Paper Division of Kimberly-Clark Corp. receives coal at a 700-foot wharf 2,000 feet W of the mouth of Anna River. The wharf has reported depths of 14 to 23 feet alongside and a deck height of about 5 feet.

(98) **Small-craft facilities.**–The L-shaped city dock is 0.6 mile W of the mouth of Anna River. The dock has depths of 14 to 21 feet along the outer face and depths greater than 6 feet along the remainder of the outer half. Facilities developed by the Michigan State Waterways Commission are at the dock. Transient berths, electricity, and sewage pump-out facilities are available. Fuel is available by tank truck and some repairs are available from local garages. A launching ramp is 0.6 mile NW of the dock. The ruins of a large dock are 0.4 mile NW of the city dock.

(99) From Powell Point, on the W side of the entrance to South Bay, the shore trends SW for 1.5 miles, thence NW for 3 miles to **Fivemile Point,** and thence W for 2.5 miles to **Au Train Point. Bay Furnace** is the bight formed W of Powell Point. From a width of 0.2 mile in Bay Furnace, the shoal border increases to a width of 1.2 miles NE of Fivemile Point. **Williams Island** is near the outer edge of the shoals NE of Fivemile Point. **Wood Island,** surrounded by shoals, is 2 miles N of Fivemile Point. A deep passage, obstructed by several detached 20- to 24-foot spots, leads between Wood and Williams Islands. Shoals extend 0.9 mile N of Au Train Point, and a detached shoal with a least depth of 10 feet is 1.3 miles N of the point.

(100) The W approach to Grand Island Harbor, S through the deep water between Williams Island and Grand Island, is marked by a light on the S shore of Bay Furnace. The shoal that extends from the S end of Grand Island is marked by buoys.

(101) **Charts 14963, 14970.–Au Train Bay** is the bight between Au Train Point and **Au Train Island,** 5 miles W. Au Train Island is 1.1 miles N of the mainland point that forms the W side of the bay. A shoal, with a depth of 10 feet near the outer end, extends 1.3 miles NE from the point. Around the remainder of Au Train Bay, deep water is within 0.5 mile of shore. Shoals with depths of 18 and 11 feet near the outer edges extend 1.2 miles N and 0.6 mile W from Au Train Island, respectively.

(102) **Shelter Bay** is the bight between Au Train Island and the mainland shore 2.1 miles W. A 17-foot shoal is in the middle of the bay, 0.9 mile W of Au Train Island. The W shore of the bay is bluff and has deep water within 0.2 to 0.6 mile.

(103) From Shelter Bay, the shore becomes low and rocky for 2 miles NW to **Laughing Fish Point**(46°32.0′N., 87°01.2′W.), 11.7

miles NW of Au Train Point. From Laughing Fish Point, the shoreline continues low and rocky and trends SW for 5 miles to the mouth of **Sand River,** thence W for 12 miles to the mouth of **Chocolay River,** and thence become bluff again for 3 miles NW to **Lighthouse Point. Shot Point,** 3 miles W of Sand River, juts 1 mile N into the lake. Shoals extend 1 mile N in the vicinity of Laughing Fish Point and at Shot Point. Otherwise, deep water is within 0.7 mile of shore in this stretch. A group of rocks awash, marked by a buoy, is near the outer edge of the shoal border 0.8 mile NW of the mouth of Chocolay River. **Marquette Bay** is the bight formed between the mouth of Chocolay River and Lighthouse Point.

(104) **Caution.**–A 20-square-mile Emergency External Stores Jettison Area for K. I. Sawyer Air Force Base is about 9 miles NE of Marquette. Aircraft in distress may jettison auxiliary fuel tanks and any other externally mounted stores capable of being jettisoned. All vessels are cautioned not to loiter in this charted area and to avoid it completely if possible, since its use will be under emergency conditions and advance warning to clear the area will not be possible.

(105) **Marquette Harbor,** also known as **Marquette Lower Harbor,** is on the NW side of Marquette Bay, about 35 miles W of Grand Island Harbor, the nearest safe harbor to the E. The town of **Marquette, Mich.,** fronts on the harbor and is a base for commercial fishermen. Coal and caustic soda are received in the harbor.

(106) **Prominent features.**–Prominent are a silver tank about 2 miles S of the harbor, a black standpipe 500 feet above the lake on Mount Mesnard 2 miles SSW of the harbor, a stack on the SW side of the harbor, and the lighted radio masts 3 miles W of the harbor.

(107) **Marquette Light** (46°32.8′N., 87°22.6′W.), 77 feet above the water, is shown from a red square tower on a dwelling on Lighthouse Point.

(108) **Channels.**–A breakwater extends S and SE from Lighthouse Point to enclose a dredged harbor basin on its W side. The breakwater is marked by lights at the bend and at the outer end; a fog signal is at the outer end. Buoys mark the W limit of the basin. In June 1995, the controlling depth was 25 feet in the basin with lesser depths along and near the edges.

(109) **Anchorage.**–The harbor basin affords good anchorage. It is reported that vessels also sometimes anchor SW of the outer end of the breakwater.

(110) A special anchorage is at the N end of the harbor. (See **33 CFR 110.1 and 110.80b,** chapter 2, for limits and regulations.)

(111) Marquette is a **customs station.**

(112) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(113) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(114) **Marquette Coast Guard Station** is on the NE side of the harbor basin at the inner end of the breakwater.

(115) **Towage.**–Tugs are available from Sault Ste. Marie and Duluth. (See Towage under those ports.)

(116) **Wharves.**–Shiras Generating Plant receives coal at a wharf 1.2 miles SW of Marquette Light. The wharf has 675 feet of berthing space with dolphins, a reported depth of 23 feet alongside, a deck height of 10 feet, and open storage for 250,000 tons of coal. The other wharves on the W side of the harbor are either in disrepair or are seldom used.

(117) **Small-craft facilities.**–Mooring to the breakwater is prohibited. Limited emergency mooring is available at the inner end of the northernmost dock ruins in the NW corner of the harbor. Gasoline, water, electricity, and ice are available. Repairs are available at a 50-ton marine railway at the N end of the basin.

(118) From Lighthouse Point, the shore is low and rocky for 2 miles N to Presque Isle Harbor. A shoal bank, with bare rocks near the outer end, extends 0.25 mile E from Lighthouse Point. A rock awash is 150 feet E of the point. The NE edge of the shoal bank is marked by a buoy. **Picnic Rocks,** a group of small rock islands, is 0.7 mile N of Marquette Light. A stack 0.3 mile SW and a chimney 0.9 mile NW of Picnic Rocks are prominent.

(119) **Presque Isle Harbor,** also known as **Marquette Upper Harbor** or as **North Harbor,** is an indentation in the shore N of Marquette Harbor protected on the N side by Presque Isle Point. The two northernmost stacks of the powerplant on the W shore of the harbor are prominent.

(120) **Presque Isle Harbor Breakwater Light** (46°34.5′N., 87°22.5′W.), 56 feet above the water, is shown from a white cylindrical tower on a white octagonal building on the outer end of the breakwater that encloses the harbor; a fog signal is at the light.

(121) **Channels.**–A breakwater extends SE from the S end of Presque Isle Park to protect a dredged harbor basin on its W side. A buoy marks the E side of the dredged basin, and a lighted buoy marks the outer end of a lighted buoy marks the outer end of a submerged crib that extends from shore on the W side of the basin. In June 1995, the controlling depth was 30 feet in the approach to the basin from Lake Superior, thence 26 feet in the basin.

(122) **Wharves.**–Two docks at the N end of the harbor basin are owned by the Lake Superior and Ishpeming Railroad Co. Oil is received by Murphy Oil Co. at the merchandise dock. The approach to the wharf has a controlling depth of about 20 feet and is marked on the E side by a private buoy. The slip on the S side of the dock has a reported depth of 21 feet along the outer 400 feet. Iron ore and pellets are shipped from the NE side of the ore dock, 500 feet SW of the merchandise dock. The dock has a 1,200-foot face with a reported depth of 27 feet alongside and a deck height of 7 feet. Storage for 50,000 tons of pellets is available, and loading chutes can load vessels at 3,100 tons per hour.

(123) Presque Isle Station of Wisconsin Electric Co. receives coal on the SW side of the ore dock. The SW side of the dock has a 1,300-foot face with a reported depth of 27 feet alongside. An overhead conveyor with a 52-foot diameter hopper extends from shore 200 feet S of the dock. Coal received at the hopper is transported to a 900,000-ton storage area.

(124) **Small-craft facilities.**–A small-craft basin developed by the Michigan State Waterways Commission is NE of the merchandise dock. In 1978, the basin had reported depths of 5 to 6 feet. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out facilities, launching ramps, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and 9.

(125) **Presque Isle Point** (46°35.6′N., 87°22.8′W.) is the N point of the peninsula occupied by Presque Isle Park, which encloses the N side of Presque Isle Harbor. The E side of the point is deep-to, but the shoal border increases in width S to the outer end of Presque Isle Harbor breakwater. **Presque Isle Point Rocks,** a group of small rock islets, are 0.7 mile E of Presque Isle Point. A pinnacle rock covered 10 feet is 0.2 mile E of the rocks. Vessels rounding Presque Isle Point bound to or from Marquette Harbor should keep well outside these rocks. A red sector on the light on the outer end of Marquette Harbor breakwater marks these dangers.

(126) From Presque Isle Point NW for about 22 miles to Big Bay Point, the shore is generally bold. **Little Presque Isle (Granite Point)** (46°38.3′N., 87°27.5′W.) is about 5 5 miles NW of

Presque Isle Point. The SE half of the bight between these points is somewhat foul with shoals and small islands. **Partridge Island,** largest in the group, is over 200 feet high. **Middle Bay** and **Partridge Bay** are SE and W of the island, respectively. Caution is advised in navigating these bays. The most dangerous spot, covered 2 feet, is in the center of Partridge Bay 0.5 mile W of Partridge Island. **Larus Island,** 0.8 mile NW of Partridge Island, is the northwesternmost of the group. From Larus Island NW to Granite Point, the shores of the bight are fairly deep-to.

(127) **Chart 14963.**–From Little Presque Isle NW for about 17 miles to Big Bay Point, Granite Island and Stannard Rocks are the only outlying obstructions. Prominent in this reach are Thoneys (Thoney) Point 4.6 miles NW of Little Presque Isle, Saux Head Point (Sauk Head), 2.7 miles NW of Thoneys Point, **Yellow Dog Point** 3 miles SE of Big Bay Point, and **Granite Point** (46°46.9′N., 87°35.3′W.) 3 miles SE of Yellow Dog Point. Deep water is generally within 0.5 mile of shore except at a point 1.8 miles N of Saux Head Point and at Yellow Dog Point where shoals extend 0.7 mile off.

(128) **Granite Island** is a small steep island surrounded by deep water 5.6 miles ENE of Thoneys Point. A light on the island is a guide to vessels approaching Marquette Harbor from the N or W.

(129) **Stannard Rock,** 32 miles NE of Big Bay Point, consists of two large detached rock ledges. The S ledge was reported awash in 1991 and the N ledge is covered 2 feet. In 1956, a few scattered rocks awash were reported between the ledges. **Stannard Rock Light** (47°11.0′N., 87°13.5′W.), 102 feet above the water, is shown from a gray conical tower on a cylindrical crib on the S side of the N ledge. A 14-foot shoal is 1,000 feet SW of the light, and an 18-foot shoal, plainly visible to vessels passing over it in calm weather, is 0.6 mile W of the light.

(130) **Local magnetic disturbance.**–Magnetic disturbances have been observed around Stannard Rock.

(131) **Charts 14963, 14964.–Big Bay Point** (46°50.6′N., 87°41.0′W.), marked by a light, is 22 miles NW of Presque Isle Point. A shoal with a depth of 9 feet at the outer end extends 1.1 miles N from the point. A buoy marks the N end of the shoal. **Big Bay** is a deep bight enclosed by Big Bay Point on the E and **Salmon Trout Point** on the W. The S and W shores have deep water within 0.3 mile.

(132) **Big Bay Harbor** is a small-craft harbor of refuge in the SW corner of Big Bay.

(133) **Channels.**–A dredged entrance channel leads from deep water in Big Bay between converging breakwaters to an inner harbor basin. The outer ends of the E and W breakwaters are marked by a daybeacon and a light, respectively. In August 1997, the controlling depth was 6 feet in the entrance channel to the basin, hence depths of 7½ to 10 feet were in the basin.

(134) **Small-craft facilities.**–A public docking facility developed by the Michigan State Waterways Commission is in the SW corner of the basin. Transient berths, gasoline, water, electricity, sewage pump-out, launching ramp, and harbormaster services are available. The harbormaster monitors VHF-FM channels 16 and

(135) About 750 feet NW of Big Bay Harbor W breakwater, submerged dock ruins, covered 3 to 9 feet, extend about 500 feet from shore.

(136) **Chart 14964.**–From Salmon Trout Point, the shore trends NW for 8 miles to Huron River Point, thence 9 miles W to the S side of the mouth of Huron Bay. **Conway Point** and **Pine River Point,** 2 and 4 miles NW of Salmon Trout Point, respectively, are prominent. The **Huron Mountains** rise close behind the shoreline. At **Huron River Point** (46°54.6′N., 87°54.0′W.), a shoal with depths of 8 to 10 feet at the outer end extends 1.5 miles NE. The shore in the remainder of this stretch is generally clear within 0.5 mile.

(137) **Huron Islands** are a group of small islands centered 5 miles NW of Huron River Point near the entrance to Huron Bay. The islands are all bold and deep-to except for the easternmost of the group, from which rocks awash extend 0.3 mile SE. **Huron Island Light** (46°57.8′N., 87°59.9′W.), 197 feet above the water, is shown from a gray granite tower on a dwelling on the northwesternmost of the island group.

(138) **Huron Bay,** extending about 12 miles SW into the shoreline, is about 3 miles wide at the mouth and narrows to about 0.5 mile at the head. The bay has deep water within 0.5 mile of shore in the outer part, and the shores become deep-to in the inner part. **Point Abbaye** is the point at the outer end of the peninsula that separates the W side of Huron Bay from Keweenaw Bay. **Point Abbaye Reef,** with a depth of 6 feet at the outer end, extends 1.5 miles E from the point. Buoys mark the N and SE edges of the reef.

(139) **Huron Bay Light** marks the outer end of a small projection of land on the SE side of the bay about 6 miles SW of Point Abbaye.

(140) **Skanee, Mich.,** is a small village with dilapidated wharves about 0.8 mile S of Huron Bay Light. A small-craft basin is between the light and village. In 1978, the reported controlling depths were 5½ feet in the entrance channel with 7 to 10 feet in the basin. Transient berths, gasoline, water, electricity, sewage pump-out facilities, and a launching ramp are available.

(141) **Huron Bay, Mich.,** is an abandoned village on the E side near the head of Huron Bay. The ruins of two wharves extend about 1,000 feet from shore. The slip between the wharves has depths less than 2 feet except at the outer end. Very shoal water is on the outer sides of both wharves.

(142) **Charts 14964, 14971.–Keweenaw Bay** extends about 22 miles SW on the NW side of Point Abbaye and is enclosed on the W by the inner end of the E side of Keweenaw Peninsula. The bay is 12 miles wide at the entrance and has a minimum width of 1.1 miles abreast Sand Point, about 2.3 miles from the head of the bay. The E shore of the bay has deep water within 0.4 mile and the W shore within 0.7 mile.

(143) A headland, 1 mile wide at the inner end and 2 miles wide at the outer end, extends 1.7 miles NW from shore about 13 miles SW of Point Abbaye. **Sand Bay** is the bight on the NE side of the headland, and **Pequaming Bay** is the bight on the SW side. **Sand Point,** marked by a light, is a projection from the W side of the bay about 2.3 miles from the head. A 1-foot shoal, marked on the SE side by a buoy, extends 1,000 feet S from Sand Point. **L'Anse Bay** is the part of Keweenaw Bay above Sand Point. **Portage River** (see also chart 14972) flows into the W side of Keweenaw Bay about 13.5 miles W of Point Abbaye.

(144) **Pequaming, Mich.,** is a village on the NW side of Pequaming Bay, about 15 miles SW of Point Abbaye. Dock ruins extend about 1,200 feet S from the headland that forms the W side of the bay. A wharf in poor condition parallels the dock ruins with a slip between. In 1966, depths in the slip were 17 feet at the outer end decreasing to 7 feet at the inner end, and depths were 19 feet along the outer 500 feet of the E side of the wharf. The mooring facilities on the E side of the wharf are dilapidated. NE of the wharf, submerged dock ruins extend S from the N shore of the bay. A small

island at the outer end of the ruins is the only part visible. A line of submerged cribs, in depths of 8 to 14 feet, extends E from the island to the E shore of the bay. No facilities are maintained at the village. There is excellent protection, but caution must be exercised when approaching or landing at the dock ruins.

(145) **L'Anse, Mich.,** is a village at the mouth of **Falls River** on the SE side of L'Anse Bay. A silver water tank on the S side of the river mouth and a stack on the N side of the river mouth are prominent.

(146) **Caution.**–Submerged ruins and a sunken wreck extend 500 feet NW from the N side of the river mouth. A buoy marks the outer end of the ruins.

(147) **Wharf.**–The wharf of the Celotex Corp. extends 800 feet NW from the S side of the river mouth, thence 3,000 feet SW along the shore. The N face has depths of 19 feet, decreasing to 12 feet 300 feet from the outer end. The W face has depths of 19 to 22 feet along the NE 900 feet. Vessels should approach the wharf on a line parallel with the NE face to avoid a 17-foot shoal about 650 feet WNW of the N corner of the wharf.

(148) **Small-craft facilities.**–The municipal marina is on the N side of the river mouth. In 1972, the controlling depth was 4 feet in the approach and marina basin. Water is available at the marina and gasoline and most supplies are available nearby in town. L'Anse has a hospital.

(149) **Baraga, Mich.,** is a village on the NW side of L'Anse Bay. The silver tank on high ground W of the village is prominent. Two jetties extend E from shore at the village. The S jetty, 1,200 feet long, has submerged ruins extending 200 feet from its outer end and 900 feet off the S side. About 200 feet N, the second jetty, wooded over, extends 700 feet from shore to depths of about 18 feet. Lime is occasionally received at the village.

(150) **Small-craft facilities.**–In 1972, the slip between the jetties had depths of 17 to 7 feet. A Michigan State Waterways Commission dock provides transient berths, sewage pump-out, and a launching ramp.

(151) **Keweenaw Bay, Mich.,** is a village on the W side of Keweenaw Bay opposite Pequaming. An abandoned coal dock in ruins extends E from shore. Rock bluffs just N of the dock are prominent.

(152) **Charts 14964, 14972.–Keweenaw Waterway,** about 25 miles long, crosses **Keweenaw Peninsula** from Keweenaw Bay on the SE side to the open water of Lake Superior on the NW side. The waterway follows Portage River from its mouth in Keweenaw Bay for 5 miles to Portage Lake, thence extends for 17.5 miles through the lake to its head, and thence follows a dredged cut from the head of Portage Lake to Lake Superior.

(153) **Regulations.**–An 8 mph (7 knots) **speed limit** is enforced in Keweenaw Waterway. (See **33 CFR 162.115,** chapter 2, for Keweenaw Waterway regulations.)

(154) On the vessel route between Sault Ste. Marie and Duluth, the distance through the waterway is about 5 miles greater than by the open lake route. However, between Marquette and Duluth the waterway provides a savings of about 22 miles, and between Marquette and Ashland a savings of about 26 miles, as compared with the route around the outside of Keweenaw Point. The use of the waterway for refuge is indicated by the fact that more freight passes through the canals in October and November, the stormy season, than at any other time in the year, although the commerce on Lake Superior, as shown by the records at the Sault and at the head of the lake, is heaviest during July and August.

(155) **Channels.**–The E entrance in Keweenaw Bay is protected by a breakwater that extends S from the E side of the mouth of Portage River. The dredged channel leads W of the breakwater through Portage River, Portage Lake, and thence through the dredged canal connecting Portage Lake with Lake Superior. The entrance at Lake Superior is protected by converging breakwaters. The Federal project depths through the Keweenaw Waterway are 26 to 28 feet through the lower entrance at the mouth of Portage River, thence 25 feet through the river to the deep water in Portage Lake and from the upper end of the lake through the canal, and thence 26 to 32 feet through the upper entrance at Lake Superior. The channels through the waterway are well marked by lighted and unlighted buoys, lights, and lighted ranges.

(156) The breakwater at the mouth of Portage River is riprapped on the channel side, and it should not be approached closer than 20 feet by vessels exceeding a 12-foot draft.

(157) **Keweenaw Waterway Lower Entrance Light** (46°58.1′N., 88°25.9′W.), 68 feet above the water, is shown from a white octagonal tower on the outer end of the breakwater on the E side of the Keweenaw Bay entrance to the waterway; a fog signal and a radiobeacon are at the light.

(158) **Portage River Harbor of Refuge** is just inside the lower entrance to the waterway at the mouth of Portage River. This 0.5-mile-long basin has a revetment with bollards on the W side where vessels may moor.

(159) A small settlement with docks of commercial fishermen is on the W side of the river mouth S of the mooring pier. Marinas at the settlement provide limited transient berths, gasoline, water, electricity, and launching ramps. A marine railway and a 20-ton lift are available for repairs. Water and a launching ramp are available N of the mooring pier.

(160) **Portage River,** the natural outlet of Portage Lake, forms part of the Keweenaw Waterway for 5 miles from its mouth in Keweenaw Bay to Portage Lake.

(161) In October 1998, the midchannel controlling depths were 23 feet in Portage River and in the harbor of refuge; depths from 16 to 20 feet were alongside the mooring pier on the W side of the harbor of refuge.

(162) **Portage Lake,** about 17.5 miles long, is generally narrow, resembling a river, but has no sensible current. The lower 3.5 miles of the lake, locally known as Big Portage, is over 2 miles wide. Portage River flows from the SE corner of the lake, and **Pike Bay** is in the SW corner, the two being divided by the flats at the mouth of **Sturgeon River.** About 3 miles N of the head of Portage River, the lake is divided by **Grosse Point. Torch Bay** extends E from the point. The main body of the lake extends 2 miles N, thence turns W at **Pilgrim Point** for about 5.5 miles between the towns of Hancock and Houghton, and thence extends N for about 5 miles to the head of the lake. Above Grosse Point, the lake narrows to 0.5 mile and in the upper part has widths of 0.15 to 0.4 mile.

(163) **Channels.**–Keweenaw Waterway leads from the head of Portage River through the natural deep water of the lower part of Portage Lake. A 19-foot spot and a 20-foot spot are in the N part of Portgage Lake about 0.7 mile and 1.8 miles S of Pilgrim Point Light in about 47°05′46″N., 88°30′26″W. and 44°04′52″N., 88°30′26″W., respectively. An unmarked shoal extends about 240 yards off the E shore about 1.3 miles NNW of Grosse Point; caution is advised. Above Pilgrim Point, the channel is dredged. In 1996-October 1998, the midchannel controlling depth in the dredged channel was 23 feet.

(164) **Pike Bay,** at the SW corner of Portage Lake, is entered through a narrow channel with depths of about 9 feet. The pile remains of a former lumber wharf are on the W side of the bay at the village of **Chassell, Mich.**

(165) **Torch Bay** extends NE and bends N for about 6 miles from Grosse Point. The bay narrows from about 1.3 miles wide at the mouth to 0.15 mile at the head. The lower part of the bay is deep, but the upper part is shallow. **Torch Lake Canal** connects the head of the bay with Torch Lake. A narrow channel, marked by private buoys, leads for 4 miles through the upper part of Torch Bay and Torch Lake Canal. In 1972, the channel had a controlling depth of 19 feet. **Torch Lake** is about 5 miles long with a maximum width of 1.5 miles. The towns of **Lake Linden** and **Hubbell** and a few logging plants are on the NW side of the lake. Coal is received at a wharf at Hubbell. For several years, extensive stamp sand deposits along the W shore of the lake were in the process of being removed for reprocessing and redeposit into the lake, causing a continuing change in the shoreline and depths. These reclamation operations ceased prior to 1970.

(166) **Dollar Bay** is a small inlet 2 miles N of Grosse Point on the turn of Portage Lake opposite Pilgrim Point. A repair yard on the NW side of the entrance to the bay at the village of **Dollar Bay, Mich.,** makes hull and engine repairs to small craft and fishing vessels.

(167) Heating oil and diesel fuel are received at a wharf operated by Standard Oil Co. 0.6 mile W of the mouth of Dollar Bay. The wharf has 250 feet of berthing space with dolphins, a reported depth of 22 feet alongside, a deck height of 6 feet, and tank storage for 166,000 barrels. Upper Peninsula Power Co. receives coal at a wharf 0.4 mile W. The wharf is 880 feet long with a reported depth of 20 feet alongside and a deck height of 6 feet. There is storage for 80,000 tons of coal.

(168) **Hancock, Mich.,** on the N side of Portage Lake 3.5 miles W of Dollar Bay, and **Houghton, Mich.,** on the S side of the lake opposite, are the largest communities on Keweenaw Waterway. Houghton is a **customs station.** Hancock has two large hospitals. The wharves at Hancock are in good condition, but most of those at Houghton are becoming ruins.

(169) A combination highway and railroad double-deck vertical lift bridge crosses Portage Lake from Houghton to Hancock. The bridge has a clearance of 7 feet down and 103 feet up. The lift span may be stopped at intermediate elevations, with a pointer on the lift span indicating the vertical clearance above high water, which for this bridge is 3.3 feet above Low Water Datum. Fixed red lights are shown on top of the lift span towers and a fixed white light is shown at center of top of the lift span. A light at center of the bottom of the lift span shows red and is changed to green when the lift is raised sufficiently for passage. (See **33 CFR 117.1 through 117.59 and 117.635,** chapter 2, for drawbridge regulations.)

(170) Salt is received by Mattila Contracting Co. at a 550-foot wharf 1.8 miles W of the lift bridge at Hancock. The wharf has a deck height of 4 feet and reported depths of 12 feet alongside, increasing rapidly away from the dock.

(171) **Small-craft facilities.**–A marina developed by the Michigan State Waterways Commission at Hancock, just E of the lift bridge, provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, launching ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. Dock space for small craft is also available at the village of **Ripley, Mich.,** just E of Hancock. A public docking facility for day use only is at Houghton, just E of the lift bridge.

(172) **Ferry.**–A ferry service operates between Houghton, 0.5 mile E of the lift bridge, and Isle Royale in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich., 49931.

(173) The upper entrance to Keweenaw Waterway leads SE from deep water in Lake Superior between converging breakwaters to a revetted dredged canal that leads S to the upper end of Portage Lake. In September-October 1996, the midchannel controlling depth through the dredged canal was 23 feet. Mooring to the revetments is prohibited.

(174) **Keweenaw Upper Entrance Light** (47°14.1′N., 88°37.8′W.), 82 feet above the water, is shown from a white square tower on the outer end of the E breakwater at the Lake Superior entrance to Keweenaw Waterway; a fog signal is at the light. The outer end of the W breakwater is marked by a light.

(175) **Portage Coast Guard Station** is on the E side of the waterway about 0.2 mile W of the lift bridge at Hancock.

(176) **Lily Pond Harbor of Refuge** is a basin about 1.5 miles SE of the breakwater entrance. Due to unsafe structural conditions, the revetment on the E side of the basin can no longer be used for mooring. Breakwater stone for stabilization extends 15 to 20 feet from the revetment.

(177) **Chart 14964.**–From the lower entrance to Keweenaw Waterway, the SE shore of Keweenaw Peninsula extends NE for 15 miles to **Traverse Point** (47°08.5′N., 88°14.1′W.). Deep water is within 0.5 mile of shore. **Traverse Island** is 2 miles offshore 4.3 miles SSW of Traverse Point. A narrow shoal extends 0.8 mile SW from the SW point of the island. In 1966, a small gravel island, 3 feet high, was reported near the outer end of the shoal. Shoals extend 0.1 to 0.2 mile off the other shores of the island. A deep passage 1.7 miles wide leads between the island and the mainland shore.

(178) **Little Traverse Bay** is a semicircular bight about 2 miles wide on the SW side of Traverse Point. The bay provides protection from W to NE winds and has a sandy bottom. **Grand Traverse Bay** is a broad indentation on the N side of Traverse Point. A shoal with a depth of 14 feet at the outer edge extends 1.1 miles from the N shore of the bay. In 1965, the ruins of a coal dock, covered 1½ feet, were reported to extend about 150 feet from shore near the NW corner of the bay. A stack at the village of **Gay, Mich.,** just N of the bay, is prominent.

(179) **Grand Traverse Bay Harbor** is a small-craft harbor near the center of the W shore of Grand Traverse Bay at the mouth of the **Traverse River,** about 18 miles NE of the lower entrance to Keweenaw Waterway.

(180) **Channels.**–A dredged entrance channel leads from deep water in Grand Traverse Bay between breakwaters at the mouth of Traverse River to an inner harbor basin. The outer ends of the breakwaters are marked by lights. An extension channel leads NE from the inner basin upstream in the river for about 150 feet. In July 1997, most of the entrance channel just SE of the end of the S pier had shoaled to about 3 feet. Greater depths were available along the E edge using local knowledge. The controlling depth in the remainder of the channel was 10 feet between the piers to the basin, thence depths of 7 to 10 feet were in the basin except along the W edge, thence a controlling depth of 7 feet was about halfway up the extension channel with gradual shoaling to 2½ feet to the head of the project.

(181) **Small-craft facilities.**–Local boaters are the major users of the harbor; facilities for recreational small craft are very limited. No dockside facilities for marine repair or maintenance are available, and the nearest store is about 5 miles by road at the village of Gay. The Michigan State Waterways Commission has developed a public docking facility on the S side of the basin. A launching ramp is available.

(182) From the N side of Grand Traverse Bay, the shore extends NE for about 15 miles to **Point Isabelle** (47°20.7′N., 87°56.2′W.). Shoals extend as much as 0.7 mile from shore in this stretch. Point Isabelle forms the S side of Bete Grise Bay. A shallow rocky bank extends 0.9 mile NE from the point and is marked at the outer edge by a buoy.

(183) **Bete Grise Bay** extends 2 miles W on the N side of Point Isabelle. The S shore is low and rocky, the W shore low and sandy, and the N shore bluff and rocky. The bay has good holding ground with protection from W to NE winds. **Mount Houghton** and **Mount Bohemia,** N and WNW of the bay, respectively, are prominent. A fire tower is on Mount Bohemia.

(184) **Lac La Belle Harbor** is at the head of Bete Grise Bay, about 36 miles NE of the lower entrance to Keweenaw Waterway. A dredged canal leads from the head of the bay W for about 0.7 mile to **Lac La Belle,** a small inland lake about 2.5 miles long, 1 mile wide, and up to 37 feet deep. An abandoned lighthouse is on the S side of the canal about 0.2 mile W of the entrance.

(185) **Channels.**–The canal is entered between parallel piers at its mouth in Bete Grise Bay. The outer ends of the piers are marked by lights. In June 1999, the controlling depth was 6½ feet (8 feet at midchannel) through the dredged channel; thence in June 1984, 6 feet in the remainder of the canal to natural deep water in Lac La Belle.

(186) **Anchorage.**–Lac La Belle has good anchorage, generally mud bottom.

(187) **Small-craft facilities.**–The Michigan State Waterways Commission has developed a public dock at the head of the cove at the NW end of the lake. Transient berthing, gasoline, and a launching ramp are available.

(188) From the head of Bete Grise Bay, the shore extends E for about 11.5 miles to **Keweenaw Point** (47°24.1′N., 87°43.0′W.), the E extremity of Keweenaw Peninsula. This stretch is generally bold and deep-to. Elevations to 600 feet are close to the water. A boulder ledge, covered 3 feet, extends 0.4 mile S from Keweenaw Point and is marked on the SE side by a lighted buoy. **Keystone Bay,** just W of Keweenaw Point, has good holding ground with protection from W to NE winds.

(189) **Manitou Island,** 3 miles long and up to 1.4 miles wide, has its W end 2.8 miles E of Keweenaw Point. The deepwater passage between the point and the island is 1.8 miles wide. **Manitou Light** (47°25.2′N., 87°35.2′W.), 81 feet above the water, is shown from a white cylindrical tower on the E point of the island. A fog signal, radiobeacon, and radar beacon (Racon) are at the light.

(190) Rocky ledges extend about 0.3 mile off the N and S shores of Manitou Island, increasing in width toward the narrow W end where the ledge extends 0.8 mile W. **Gull Rock,** marked by a light, is near the outer edge of the ledge W of the island. A 12-foot shoal, marked on the W side by a buoy, is 0.7 mile S of Gull Rock. A boulder, covered 26 feet, is 1.7 miles S of Gull Rock.

(191) **Fishermans Bay,** an indentation in the E end of Manitou Island, has good holding ground with protection from W to NE winds. A shoal with a depth of 4 feet at the outer end extends 0.4 mile E from the S side of the entrance to the bay.

(192) From the tip of Keweenaw Point, the shore extends N for 2.6 miles, thence turns NW and bends W for 7.5 miles to the entrance to Copper Harbor. The shore in this stretch is low and rocky with high bluffs close behind. Deep water is generally close to shore.

(193) **Copper Harbor** is a broad inlet on the N side of Keweenaw Peninsula about 9 miles NW of Keweenaw Point. Narrow points of land extend from shore on either side of the entrance and leave an opening 1.4 miles wide. Islands and shoals extend about 1.1 miles E from the W point, and shoals extend about 0.15 mile W from the E point. The entrance between the shoals, marked by a bell buoy and a **190°** lighted range, is about 550 feet wide with a depth of about 14 feet.

(194) **Copper Harbor Light** (47°28.5′N., 87°51.6′W.), 90 feet above the water, is shown from a white skeleton tower near a white dwelling on the E entrance point.

(195) Copper Harbor provides protection from the NE and NW storms that are frequent in this area. The W end of the harbor has good holding ground. Several shoals in the harbor are dangerous to navigation. A 12-foot shoal is 0.2 mile S of Copper Harbor Light.

(196) **Copper Harbor, Mich.,** is a village on the SW side of Copper Harbor. A public docking facility developed by the Michigan State Waterways Commission at the village provides berths, gasoline, water, electricity, sewage pump-out, and a launching ramp. The harbormaster monitors VHF-FM channels 16 and 9.

(197) **Ferry.**–A ferry service operates between Copper Harbor and Isle Royale in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich., 49931.

(198) From Copper Harbor W for 8 miles to Agate Harbor, deep water is within 0.2 mile of shore, thence W for 5 miles to Eagle Harbor, dangerous rocks and reefs parallel the shore 0.2 to 0.5 mile off.

(199) **Agate Harbor** consists of a N and a S harbor parallel to each other and open to W. The harbors are enclosed by two narrow peninsulas that extend W from the mainland and by islets and reefs that extend W from the ends of the peninsulas. These harbors afford safe shelter and good holding ground for small craft. Extreme caution must be exercised to avoid the reefs when entering. The maximum available depth across the outer line of shoals at the entrance to the N harbor is 19 feet.

(200) **Little Grand Marais Harbor,** about 3 miles W of Agate Harbor, is nearly landlocked, with a narrow opening to N. The entrance is blocked by a shoal.

(201) **Eagle Harbor,** 13.5 miles W of Copper Harbor, is a partially enclosed bay on the N side of Keweenaw Peninsula. The harbor is about 1 mile long and 0.2 mile wide, but only the center has good depths, 12 to 20 feet. The bottom in this area is stone, and the holding ground is not good.

(202) **Eagle Harbor Light** (47°27.6′N., 88°09.5′W.), 60 feet above the water, is shown from a white octagonal tower on a red dwelling on the W entrance point to Eagle Harbor.

(203) **Channels.**–A channel leads between two partially submerged cribs from Lake Superior to deep water inside the harbor, and a basin has been dredged off a Michigan State Waterways Commission facility at the E end of the harbor. The entrance to the harbor is marked by a gong buoy and a **150°** lighted range. In June 1999, the dredged harbor basin had a controlling depth of 8½ feet with lesser depths to 3 feet along the edges.

(204) **Caution.**–Two dangerous reefs are in the approach to Eagle Harbor. A reef with a least depth of 2 feet is 0.25 mile NE of Eagle Harbor Light on the E side of the rangeline. A reef with rocks awash is 0.2 mile NW of the light on the W side of the rangeline.

(205) The slightly deteriorated gray stone cribs on either side of the entrance channel project about 5 feet above the lake level. The W crib is about 100 feet long and the E about 50 feet long, with portions submerged. The horizontal clearance between the cribs is about 120 feet normal to the channel.

(206) **Small-craft facilities.**–A public docking facility developed by the Michigan State Waterways Commission on the N side

of the dredged basin provides gasoline, water, electricity, sewage pump-out, and a launching ramp.

(207) From Eagle Harbor, the shore trends SW for about 28 miles to the upper entrance to Keweenaw Waterway. The shore is generally bluff and may be closely approached with the exception of several shoals. From Eagle Harbor for 7 miles to Eagle River, a succession of dangerous shoals parallel the shore from 0.25 to 1 mile off. **Great Sand Bay** is an indentation from 3 to 6 miles SW of Eagle Harbor. A shoal with a least depth of 6 feet extends 1.1 miles W from the E entrance point to the bay. **Eagle River Shoals,** with a least depth of 4 feet, parallels the shore from the center of Great Sand Bay SW to Eagle River.

(208) **Eagle River, Mich.,** a village 7 miles SW of Eagle Harbor, has been abandoned as a commercial port. The cribs of the former dock are submerged.

(209) **Five Mile Point** (47°23.5′N., 88°22.3′W.), 4 miles SW of Eagle River, is marked by a prominent abandoned lighthouse. **Hutchinson Shoal,** with a least depth of 14 feet, is 0.5 mile offshore 1.6 miles WSW of Five Mile Point. About 1 mile NE of the entrance to Keweenaw Waterway, a shoal with a depth of 8 feet near the outer end extends 1 mile N from shore. Vessels approaching or leaving the canal should take care to avoid the shoal.

(210) **Charts 14964, 14965.**–From the Keweenaw Waterway entrance, the shore trends SW for about 41 miles to Ontonagon Harbor. None of the rivers that flow into the lake in this stretch are navigable, nor are there any docking facilities. Prominent are stacks at **Redridge** and **Freda,** 8.5 and 11 miles SW of the waterway, respectively.

(211) **Chart 14965.–Misery Bay,** 13 miles SW of Freda, and **Sleeping Bay,** just W of Misery Bay, offer limited protection. **Fourteen Mile Point** (46°59.7′N., 89°07.7′W.), on the W side of Sleeping Bay, is marked by a prominent abandoned lighthouse.

(212) **Ontonagon Harbor,** serving the town of **Ontonagon, Mich.,** is at the mouth of **Ontonagon River.** It is the only harbor of refuge along the 79-mile stretch from the Keweenaw Waterway to Black River Harbor. The harbor is used extensively by commercial fishermen. Coal is received at a wharf on the W side of the river just above the mouth. A hospital is in the town. Prominent are a blue tank, stacks, and buildings at the paper company on the W side of the river mouth and a blue water tank about 1 mile SE of the river mouth.

(213) **Channels.**–A dredged entrance channel leads from deep water in Lake Superior between the parallel piers to the mouth of Ontonagon River, thence upstream for about 0.4 mile to just below the Ontonagon Street bridge. The outer ends of the piers are marked by lights; a fog signal is at the W pierhead light. In June 1997, the controlling depths were 15 feet (19 feet at midchannel) in the entrance channel and the channel between the piers, thence 18 feet to the bridge except for lesser depths to 17 feet along the W edge and shoaling just below the bridge. Shoaling in the harbor occurs annually during the winter.

(214) **Bridges.**–The SR64 swing highway bridge at the head of the dredged channel has a 27-foot E draw and 31-foot W draw, each with a clearance of 7 feet. (See **33 CFR 117.1 through 117.59 and 117.639,** chapter 2, for drawbridge regulations.) The fixed railroad bridge 0.4 mile upstream has a clearance of 8 feet. Overhead cables 600 feet below and above the railroad bridge have clearances of 20 and 35 feet, respectively.

(215) **Small-craft facilities.**–A public docking facility developed by the Michigan State Waterways Commission is in a basin on the W side of the river 0.2 mile above the highway bridge. In 1978, it was reported that local interests annually dredge the entrance and basin to a depth of 7 feet. Transient berths, gasoline, water, electricity, sewage pump-out, launching ramp, and harbormaster services. The harbormaster monitors VHF-FM channels 16 and 9. A 30-ton hoist is available.

(216) From Ontonagon, the shore extends SW for about 6 miles to the village of **Green,** thence W for about 15 miles, and thence SW for 18 miles to Black River Harbor. For 15 miles W from Ontonagon, the shore is low, and shoals extend 0.7 mile off.

(217) **Silver City, Mich.,** is a village at the mouth of **Big Iron River,** 12 miles WSW of Ontonagon. In 1978, the reported controlling depth through the river mouth was 2 feet. The river should not be attempted without local knowledge. Prominent are a 500-foot stack, upper third black, on higher ground 4.5 miles S of Silver City and a television mast 6 miles W of the village. **Union Bay,** just W of Silver City, affords limited protection.

(218) **Porcupine Mountains** rise about 2 miles W of Silver City and extend 15 miles SW with some elevations 1,200 feet above the lake. The shoal border in the vicinity of the mountains is narrow, thence at the SW end of the mountains, the shoal border widens to 0.5 mile SW to Black River Harbor. A 20-foot-high rock is close offshore 14 miles NE of Black River Harbor. None of the rivers that flow into this reach are navigable.

(219) **Time.**–Lakeshore areas of the United States W of 89°50.7′W., which is about midway between Silver City and Black River Harbor on Lake Superior, observe central standard time or central daylight saving time. Areas E of this meridian, including the lakeshore areas of the Canadian Province of Ontario, observe eastern standard time or eastern daylight saving time.

(220) **Caution.**–A special use airspace, bounded by the following coordinates: 47°45′N., 90°05′W.; 47°45′N., 89°28′W.; 46°55′N., 89°28′W.; 46°55′N., 90°05′W., is used periodically for air-to-air gunnery practice from the surface to an altitude of 45,000 feet. The using agency is the Commander, Second Air Force, Barksdale AFB, La., and the controlling agency is Minneapolis ARTC Center, Federal Aviation Administration.

(221) **Black River Harbor,** at the mouth of the **Black River,** 37 miles SW of Ontonagon Harbor, offers shelter for commercial fishing and recreational craft. A park and recreation area maintained by the U.S. Forest Service are adjacent to the harbor.

(222) **Channels.**–A dredged entrance channel leads from deep water in Lake Superior between converging breakwaters to a harbor basin inside the mouth of the river. The outer ends of the breakwaters are marked by lights, and the E side of the channel inside the breakwaters is marked by a buoy. In July 1997, the controlling depths were 7 feet to the harbor basin, thence 6 to 8 feet in the basin with lesser depths along the E edge. Greate depths were available in the entrance and river channels with local knowledge.

(223) **Small-craft facilities.**–Facilities developed by the Michigan State Waterways Commission are in the harbor basin. The surrounding area is sparsely populated, and only a few dock spaces are along the W side of the river. Gasoline, water, electricity, sewage pump-out facilities, and a launching ramp are available.

(224) From Black River Harbor, the shore is bold for 20 miles SW to Saxon Harbor. Shoals extend about 0.3 mile from shore. **Little Girls Point,** 6 miles NE of Saxon Harbor, is the only projection along this stretch.

(225) **Charts 14965, 14966, 14973.**–The **State boundary** between Michigan and Wisconsin, about 1 mile NE of Saxon Harbor, follows the course of **Montreal River.** The river is not navigable.

(226) **Saxon Harbor,** 57 miles SW of Ontonagon Harbor, is at the original mouth of **Oronto Creek.**

(227) **Channels.**–A dredged entrance channel leads from Lake Superior between converging breakwaters to an inner harbor basin and channel. The outer ends of the breakwaters are marked by lights. In June 1998, the controlling depth was 3½ feet (6½ feet at midchannel) to the inner basin; thence depths of 7 to 8 feet were in the basin with lesser depths along the side; and thence a controlling depth of 7 feet was in the inner harbor channel.

(228) **Small-craft facilities.**–A 300-foot mooring dock with a launching ramp is on the E side of the harbor. Berths, gasoline, electricity, marine supplies, and sewage pump-out facilities are available in the harbor.

(229) **Charts 14966, 14973.**–From Saxon Harbor, the shore extends NW for about 21 miles to the W end of Long Island at the entrance to Chequamegon Bay. **Marble Point,** about 4 miles NW of Saxon Harbor, is at the W end of the bluffs that characterize the shore W of the Porcupine Mountains. W of Marble Point to Chequamegon Bay, the shore is low and marshy, and shoals extend no more than 0.7 mile from shore.

(230) **Long Island** is an extension of **Chequamegon Point,** separated from it by a reappearing sandbar. The island and point, both sandy and wooded, have a total length of about 7 miles and a width of less than 0.25 mile. Together they form the NE side of Chequamegon Bay. **Chequamegon Point Light** (46°43.7′N., 90°48.6′W.), 33 feet above the water, is shown from a white square pyramidal skeleton tower, upper part enclosed, on the W end of Long Island; a fog signal is at the light.

(231) The Apostle Islands are N of this stretch of shore. Madeline Island, the S island of the group, is 1.5 miles N of Long Island. **South Channel,** the deepwater passage between Madeline and Long Islands, is the E approach to Chequamegon Bay. The N side of the channel is marked by a lighted buoy that marks the extent of shoals off the SW end of Madeline Island. **La Pointe Light** (46°43.7′N., 90°47.1′W.), 70 feet above the water, is shown from a white cylindrical tower on the N side of Long Island; a fog signal is at the light. A wreck, covered 9 feet, is off the NE shore of Long Island, 0.9 mile SE of La Pointe Light.

(232) **Charts 14966, 14973, 14974.–Chequamegon Bay,** separated from Lake Superior by Chequamegon Point and Long Island, is about 12 miles long and 5 miles wide. The bay is entered through the deep water W of Long Island. The deep water follows close to the W shore of the bay to within about 4 miles of the head, thence extends S across the bay to the wharves at Ashland. The limit of the shoal border off **Houghton Point,** on the W shore 3 miles SW of Chequamegon Point Light, is marked by a lighted buoy. N of Ashland, the E part of the bay is filled with an extensive flat. The shoalest water is around **Oak Point** in the E corner of the bay. The W edge of the flat is marked by a lighted buoy 2.2 miles S of Houghton Point. Above Ashland, the bay shoals gradually toward the head.

(233) **Ashland Harbor,** serving the city of **Ashland, Wis.,** is on the SE side near the head of Chequamegon Bay. The harbor is sheltered from the storms of Lake Superior by Chequamegon Point, Long Island, and the Apostle Islands. However, the size of the bay permits the generation of waves within itself, and in NE storms, when accompanied by swells coming in from the lake, heavy seas occur in the bay. A breakwater NE of the Ashland wharves provides protection for the harbor facilities. The city of Ashland is on a low bluff that fronts the SE side of the bay. Stacks and spires in the city are prominent.

(234) **Channels.**–A 1½-mile-long breakwater, on a NW-SE line about 2 miles NE of the center of the Ashland waterfront, provides protection for the waterfront and the dredged areas along it. The ends of the breakwater are marked by lights. A dredged basin is off the piers in the E part of the harbor, and a dredged channel leads from deep water in the bay along the piers in the W part of the harbor. The basin and channel are well marked by buoys.

(235) In 1972, the controlling depths were 26 feet in the W part of the basin and 24 feet in the E part. In 1996-August 1998, the controlling depth in the W channel was 20 feet, except in the far W section where it shoals gradually to 17 feet.

(236) A discontinued dumping ground is NE of the dredged basin, with a depth of 5 feet over it about 1,200 feet from the basin. The area must be avoided when entering or leaving the harbor by keeping to W of the buoys that mark the E side of the basin. Another discontinued dumping ground is adjacent to the NE side of the breakwater.

(237) **Caution.**–Much of the Ashland waterfront is in ruins. Piles and submerged piles extend up to 2,300 feet from shore throughout the area. The remains of piles are often adrift in the harbor.

(238) In March 1987, submerged debris was reported immediately N of the Ashland Breakwater, extending at least 4,900 feet off the breakwater, with heaviest concentration at a point about 2,790 feet, 061° from Ashland Breakwater Light.

(239) Ashland is a **customs port of entry.**

(240) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(241) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(242) **Towage.**–Tugs are available from Duluth. (See Towage under Duluth.)

(243) **Wharves.**–Ashland at one time had a thriving waterfront, but now only one deep-draft dock is in operation. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facility described are reported depths. (For information on the latest depths, contact the operator.)

(244) **C. Reiss Coal Co. Dock:** (46°35′33″N., 90°53′41″W.); about 1,000 feet of berthing space along W side of pier; 16 to 22 feet alongside; deck height, 4 feet; handles limestone and coal.

(245) **Small-craft facilities.**–Berths and launching ramps for small craft are available at the city dock, 0.6 mile NE of C. Reiss Coal Co. Dock, and at a boat club 1.8 miles NE of the city dock. Fuel is available by tank truck.

(246) **Washburn Harbor** is on the W side of Chequamegon Bay, 5 miles N of Ashland on the N side of **Vandeventer Bay.** This harbor was formerly a shipping point for lumber. Ruins of the lumber wharves in the SW part of the harbor are partially submerged and form a hazard to navigation.

(247) **Small-craft facilities.**–A marina, protected by breakwaters, provides berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and sewage pump-out facilities. A 150-ton hoist is available for repairs. The city dock extends about 600 feet lakeward from the marina dock. In 1972, the city dock had depths of 17 feet along its outer end, 19 feet along the SW face, and 17 feet along the NE face. A launching ramp and a small dock are maintained by the city 0.9 mile W of the city dock.

(248) **Charts 14966, 14973.**–From Houghton Point, the shore extends NNW for 4.3 miles, thence trends NE for 5 miles to Bayfield. Except near the mouths of streams, the shore is bold, and shoals extend no more than 0.3 mile off. Most of the reach is protected from the E by Long Island and Madeline Island.

(249) **Port Superior Village, Wis.,** is a village on the N side of **Pikes Bay,** 6.3 miles N of Houghton Point. A marina at the village is protected by a detached breakwater. The entrance to the marina is marked by private buoys and lights. Transient berths, gasoline, diesel fuel, water, electricity, marine supplies, and a launching ramp are available. Hoists to 25 tons are available for hull, engine, and electronic repairs.

(250) **Bayfield, Wis.,** a village about 15 miles N of Ashland, has a well-protected harbor used principally as a base for commercial fishing tugs and recreational craft and as a harbor of refuge for small craft. Ferries operate between this harbor and La Pointe on Madeline Island. **Bayfield Harbor South Breakwater Light** (46°48.6′N., 90°48.7′W.), 25 feet above the water, is shown from a white column with a square green daymark on the S side of the entrance to the S harbor basin; a fog signal is at the light.

(251) The harbor comprises three basins formed by breakwaters that extend N and S from the city dock and from the shore N and S of the city dock. The entrance to the S basin is marked by lights on either side, and the entrance to the N basin is marked by a private light on the S side. In June 1996, the controlling depth was 10 feet in the S basin, except for shoaling on the W side of the N section. The N basin has depths of 8 to 10 feet.

(252) **Caution.**–Submerged dock ruins, covered 2 feet and marked at the outer end by a buoy, extend 550 feet from shore 0.9 mile SW of Bayfield Harbor South Breakwater Light.

(253) **Bayfield Coast Guard Station** is on the S side of the city, about 1,000 feet SW of Bayfield Harbor South Breakwater Light.

(254) The National Park Service headquarters of Apostle Islands National Lakeshore is at the old courthouse building.

(255) **Small-craft facilities.**–A marina in the S basin provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, marine supplies, and a launching ramp. A 25-ton mobile hoist can handle 65-foot craft with a 17-foot beam for repairs. Berths and other facilities are available at several other docks SW of the basins.

(256) From Bayfield the shore trends NNE for about 6 miles to **Red Cliff Point,** thence NW for about 8 miles to **Point Detour** (46°57.7′N., 90°51.8′W.), and thence SW for 13.5 miles to Cornucopia. The shore is generally bluff with several prominent points and bays. The shore in this stretch is generally deep-to and can safely be approached within 0.25 mile, except for shoals that connect the shore with York Island and Sand Island. These shoals are described with the Apostle Islands.

(257) **Buffalo Bay,** a small indentation 3 miles NNE of Bayfield, is enclosed on the S side by **Roys Point.** Red Cliff is a small settlement on the hill overlooking the bay. A small-craft basin, protected by a breakwater, is on the W side of the bay. Private buoys mark the entrance to the basin, and a private light is on the end of the breakwater. A sunken wreck is 0.45 mile NE of the basin. **Red Cliff Bay** is a small indentation on the S side of Red Cliff Point, 2.3 miles N of Buffalo Bay. A sunken wreck is close to shore on theN side of the bay.

(258) **West Channel,** a deepwater N approach to Bayfield and Chequamegon Bay, leads between Basswood Island and the mainland shore from Roys Point to Red Cliff Point. A lighted buoy on the E side of Red Cliff Point marks the turn into the channel.

(259) **Raspberry Bay,** SE of Point Detour, is enclosed on the E by **Raspberry Point.**

(260) The district office of **Apostle Islands National Lakeshore** is 1.8 miles SW of Point Detour on the S side of **Little Sand Bay.** In 1978, the L-shaped dock at the office had reported depths of 4 to 6 feet alongside. Transient berths and water are available.

(261) **Sand Point,** about 5 miles WSW of Point Detour, and **Squaw Point,** 2 miles NNE of Cornucopia, are prominent.

(262) The **Apostle Islands** are a group of about 20 wooded islands that in preglacial times were part of the peninsula that now terminates in Point Detour and Red Cliff Point. There are good deep passages around and between the islands of the group. The Apostle Islands, less Madeline Island and Eagle Island, are part of the Apostle Islands National Lakeshore. The boundary of the Lakeshore extends 0.25 mile from the shoreline of the individual islands.

(263) **Madeline Island,** the southernmost and largest of the Apostle Islands, is 12 miles long NE and SW and 1 to 3.2 miles wide. A shoal with depths less than 6 feet extends 0.5 mile SW from the SW point of the island. The outer end of the shoal is marked by a lighted buoy. Shoals extend 0.1 to 0.5 mile off the S shore of the island. **Big Bay,** the large bight midlength of the S shore, has deep water within 0.1 mile of its head. Shoals extend off 0.9 mile around the E point of the island. The NW shore of the island is bold and has deep water within 0.25 mile. At **Point De Froid,** the NW point of the island, a shoal extends 0.4 mile W. The W shore of the island has deep water within 0.35 mile.

(264) **La Pointe Harbor** serves the village of **La Pointe, Wis.,** a small old settlement and summer resort just S of Point De Froid at the W end of Madeline Island. A ferry operates between La Pointe and Bayfield.

(265) **Channels.**–An L-shaped pier and breakwater extends from shore 0.4 mile S of Point De Froid to enclose a dredged small-craft basin on its SE side. The outer end of the breakwater is marked by a light. A detached breakwater S of the L-shaped breakwater is marked by a private light on each end. Vessels may enter from the N or S of the detached breakwater. In July 1997, the controlling depths were 7 feet in the S approach, thence 10 feet in the N approach, except for a 8½-foot spot near the S edge of the L-shaped breakwater, and a 5½ foot shoal along the E edge of L-shaped breakwater. Depths of 8 feet were available in the basin, except for lesser depths to 4½ feet along the E edge.

(266) **Small-craft facilities.**–Gasoline by truck and water are available at the L-shaped pier. A marina basin 0.5 mile S is entered between breakwaters marked at the outer ends by private lights. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, a launching ramp, and a 30-ton travelift are available for hull and engine repairs.

(267) **Basswood Island** and **Hermit Island** are small bold islands about 2 miles NW of Madeline Island, SE and E of Red Cliff Point, respectively. Shoals extend about 0.2 mile off the shores of these islands. Berthing is available at a small-craft pier on the W side of Basswood Island.

(268) **Stockton Island,** 2.5 miles N of the NE end of Madeline Island, is about 7.5 miles long and generally 2.5 miles wide. **Presque Isle Point** extends 1.5 miles S from the S side of the island. Shoals extend about 0.4 mile off the E end of the island, but decrease in width toward the W end, which is deep-to. Berthing is available at small-craft piers on the E side of **Presque Isle Bay** and on the N side of **Quarry Bay.**

(269) **Michigan Island** is about 3 miles ENE of Madeline Island. **Michigan Island Light** (46°52.3′N., 90°29.8′W.), 170 feet above the water, is shown from a white cylindrical tower on the S point of the island. A shoal with a depth of 12 feet near the outer end extends 0.7 mile S from the point. The light should be given a

berth of at least 1 mile. Shoals extend 0.2 to 0.5 mile off the remainder of the S shore and the entire N shore. The W point of the island is deep-to. A rocky ledge extends 1.4 miles NE from the NE point of the island. **Gull Island,** marked by a light, is near the middle of the ledge. Between the islands, the ledge is covered about 2 feet. **Gull Island Shoal,** a detached rocky patch with a least depth of 18 feet, is 3.6 miles NE of Gull Island.

(270) **Outer Island,** the northeasternmost of the Apostle Islands, is 3 miles NE of Stockton Island. The island is about 6 miles long N and S and 2.5 miles wide with a sharp point at the SW end. **Outer Island Light** (47°04.6′N., 90°25.0′W.), 130 feet above the water, is shown from a white conical tower with attached dwelling at the N end of the island. A rocky bank extends 0.4 mile off the SW point and the SE shore of the island, narrowing to 0.1 mile off the E shore. A shoal extends 0.6 mile N from the NE point of the island. Shoals extend 0.7 mile off the NW shore and decrease to 0.15 mile wide S along the W shore. Shoals extend about 0.5 mile off the N shore. **Outer Island Shoal,** with a least depth of 16 feet, is connected to the shoal border and extends 1.2 miles N from the island. A sunken wreck is 1.5 miles NE of Outer Island Light. Berthing is available at a small-craft pier on the N side of the island.

(271) **Cat Island** is 4.3 miles W of Outer Island and 2.4 miles N of Stockton Island. Shoals extend off 0.3 to 0.5 mile around the N end of the island and decrease to 0.15 mile wide toward the S end where a shoal extends 0.6 mile S.

(272) **North Twin Island** is 1.7 miles NNW of Cat Island. Shoals extend 0.5 mile SW from the S point, 0.2 mile from the E side, and 0.2 to 0.4 mile from the N and W sides.

(273) **Rocky Island** and **South Twin Island** are about 2.8 miles SW of North Twin Island. The islands are connected at their N ends by a rocky flat with an available depth of 10 feet. Shoals extend 0.4 mile from the N and S sides of Rocky Island, 0.2 mile from the W side, and 1.1 miles NE from the NE point. Shoals extend 0.4 mile from the S side of South Twin Island and 0.6 mile from the E side. The bay between the two islands affords good anchorage with protection from W and NW winds, mud bottom. Shoals extend 0.15 mile from the E and W shores of the bay, and deep water extends to just S of the N end of South Twin Island. Berthing is available at small-craft piers on the W side of South Twin Island and on the E side of Rocky Island S of the bay.

(274) **Ironwood Island** is 1.6 miles SE of South Twin Island and 1.7 miles W of Cat Island. Shoals extend 0.2 to 0.4 mile off around the island. **Otter Island** is 0.9 mile S of Rocky Island. Shoals extend 0.4 mile off the E point of the island and 0.2 mile off the other shores. Berthing is available at a small-craft pier on the S side of the island.

(275) **Manitou Island** is 1.1 miles SW of Ironwood Island and 1.3 miles N of Stockton Island. Deep water is within 0.2 mile of the shores of the island, except at the W end where a shoal extends 0.6 mile NW. **Little Manitou Island,** a small rocky islet marked by a light, is near the outer end of the shoal.

(276) **Oak Island,** 2 miles NE of Red Cliff Point, is 4 miles long and 2.5 miles wide. Shoals extend no more than 0.3 mile from the island. **Oak Island Shoal,** with a least depth of 18 feet, is 0.9 mile N of Oak Island, in the middle of the deep passage between it and Otter Island. Berthing is available at a small-craft pier on the SW side of Oak Island.

(277) **Raspberry Island,** 2 miles NW of Oak Island and 2.2 miles N of Raspberry Point, is marked on the SW side by a light. An abandoned lighthouse is about 100 feet N of the light. Shoals extend 0.1 to 0.3 mile from the island. **Marina Shoal** extends 0.4 mile S from the SE side. A buoy marks the outer edge of the shoal on the SW side of the island. Berthing is available at a small-craft pier on the SW side of the island.

(278) **Bear Island** is 2.5 miles N of Oak Island. Shoals extend 0.6 mile from the NW side, 0.2 mile from the E and W sides, and 0.3 mile from the S side. **Bear Island Shoal,** a detached shoal with a least depth of 13 feet, is 2.2 miles WNW of Bear Island and about 1 mile NE of York Island Shoals.

(279) **Devils Island** is 2.5 miles NNE of Bear Island. **Devils Island Light** (47°04.8′N., 90°43.7′W.), 100 feet above the water, is shown from a cylindrical tower on the N end of the island. Shoals extend about 0.1 mile off the N, E, and W sides and 0.25 mile off the S end. **Devils Island Shoal,** a detached rocky spot with a least depth of 11 feet, is 1.3 miles E of the island. Berthing is available at a small-craft pier on the S side of the island.

(280) **York Island** is about 1 mile N of Point Detour. A shoal extends about 0.6 mile S from the island and leaves a passage 0.3 mile wide with depths of 20 to 24 feet between the island and the mainland. Shoals extend about 0.5 mile off the SW side and 0.25 mile off the N and E sides of the island. **York Island Shoals** are a group of detached rocky spots with a least depth of 14 feet about 2 miles NNE of York Island. The main reef is about 1 mile long and 0.4 mile wide. Several 19- to 22-foot spots are close SE. A lighted bell buoy is off the W side at the N end of the reef. The deepwater channel between the southernmost shallow spot and York Island is about 1.4 miles wide.

(281) **Sand Island,** 3.2 miles W of Point Detour and 1.4 miles N of Sand Point, is marked at the N end by a light. A shoal ridge with depths of 3 to 7 feet extends from the SE point of the island S to the mouth of **Sand River,** 1.8 miles SE of Sand Point. Shoals extend 0.6 mile off the E and N shores and 0.4 mile off the W shore. **Sand Island Shoals,** with a least depth of 14 feet, extend from 0.5 mile E of **Swallow Point,** the E point of Sand Island, N for 1.5 miles. The N end of the shoals is marked by a buoy. A sunken wreck is on the E side of the shoals. Berthing is available at a small-craft pier in **East Bay.**

(282) The N approach to West Channel leads between Sand Island Shoals and York Island Shoals, and thence between York Island and Raspberry Island.

(283) **Eagle Island,** 3.2 miles W of Sand Point, is the westernmost of the Apostle Islands. Shoals extend about 0.25 mile off the W, N, and E sides of the island. Shoals extend 0.5 mile S and 0.8 mile SSE from the island. Near the inner end of these shoals, a gravel and boulder ledge, formerly a small island, is visible during storms and low water conditions. **Eagle Island Shoals,** centered about 1.5 miles SW of Eagle Island, has a least depth of 11 feet.

(284) **Chart 14966.–Cornucopia, Wis.,** is a small-craft harbor at the mouth of **Siskiwit River** on the SE side of **Siskiwit Bay,** about 13.5 miles SW of Point Detour. The harbor is a base for commercial fish tugs and a refuge for recreational craft.

(285) **Channels.**–A dredged entrance channel leads SE from deep water in Lake Superior between two piers to an inner basin which connects two inner channels that lead E and SW. The outer end of the E pier is marked by light. In July 1998, the controlling depth was 8 feet from the entrance to the inner basin; thence depths of 4 to 8 feet were in the inner basin with lesser depths along the edges; thence depths of 6 feet in the E channel and 5½ feet in the SW channel.

(286) **Small-craft facilities.**–A dock in the SW basin arm provides transient berths, gasoline, electricity, and a launching ramp. Other services are available nearby in the village.

(287) From Cornucopia SW for about 14 miles to Port Wing, the shore is relatively bold and can be approached within 0.5 mile.

except at Bark Point where shoals extend 0.8 mile NE. **Bark Point** (46°53.1′N., 91°11.1′W.) encloses the W side of **Bark Bay.** The bay has fair holding ground with protection from all but NE winds. **Roman Point** encloses the E side of Bark Bay and separates it from Siskiwit Bay.

(288) **Herbster, Wis.,** is a small settlement at the mouth of **Cranberry River,** 5.2 miles SW of Bark Point. In 1983, the wharf at the village was in ruins.

(289) **Port Wing, Wis.,** is a village and small-craft harbor at the mouth of **Flag River,** about 28 miles SW of Point Detour and 34 miles E of Duluth. The harbor is used by commercial fish tugs and recreational craft.

(290) **Channels.**–A dredged entrance channel leads from deep water in Lake Superior between parallel piers to an inner basin which connects with two inner channels that lead E inside the shoreline and S into the Flag River. The outer end of the E pier is marked by a light. In August 1998, the controlling depths were 10 feet in the entrance channel to the inner basin; thence 6 feet (7½ feet at midchannel) in the E inner channel; thence depths of 5 to 8 feet were in the inner basin and 2 feet or less in the S inner channel. The S inner channel is subject to severe shoaling from drifting sand..

(291) **Small-craft facilities.**–Transient berths and a launching ramp are available in the harbor. Gasoline and diesel fuel must be obtained from stations in the village, 1 mile away.

(292) From Port Wing, the shore trends generally WSW for about 31 miles to Superior Entry of Duluth-Superior Harbor. The shore is relatively low and can be approached to within 0.8 mile, except for a point about 7 miles W of Port Wing where shoals extend over 1 mile from shore. None of the streams that flow into the lake in this stretch are navigable.

(293) **Charts 14966, 14975.–Duluth-Superior Harbor** is at the W end of Lake Superior. The harbor has been developed along Superior Bay and the lower part of the St. Louis River, which forms part of the **State boundary** between Wisconsin and Minnesota. It is one of the most important harbors on the Great Lakes because of its range of facilities and the magnitude of its commerce. The cities of **Superior, Wis.,** and **Duluth, Minn.,** front the S and N sides of the harbor, respectively.

(294) **Prominent features.**–Duluth is built on the side of a steep bluff that reaches over 500 feet above the lake, and the city is visible for a long distance out in Lake Superior. Enger Memorial, a lighted stone tower on a hill overlooking the city, is prominent, as are radio and television masts N of it. Grain elevators on Rices Point and Duluth Entry Bridge are also prominent.

(295) Superior is built on lower ground and is relatively less prominent from the lake. The ore docks opposite Superior Entry and the grain elevators 1 mile NW and on the SW side of Howards Bay are prominent.

(296) **Superior Entry South Breakwater Light** (46°42.6′N., 92°00.4′W.), 70 feet above the water, is shown from a white cylindrical tower on a white building on the outer end of the breakwater on the S side of the S harbor entrance. A fog signal is at the light.

(297) **Duluth Harbor South Breakwater Inner Light** (46°46.7′N., 92°05.5′W.), 68 feet above the water, is shown from a black cylindrical tower with a white lantern room on the S side of the N harbor entrance.

(298) **Superior Bay,** about 6.5 miles long and 0.5 to 1 mile wide, is a natural shallow basin separated from Lake Superior by **Minnesota Point,** a low, narrow strip of sand and gravel. The bay is entered from Lake Superior through **Duluth Entry** at the N end of Minnesota Point and through **Superior Entry** at the S end of the point. Between the entrances, the lakeside of Minnesota Point has deep water within 0.4 mile. A submerged breakwater extends 1,000 feet S from shore in the small bight on the N side of Duluth Entry. A buoy marks the outer end of the ruins. Several cribs are on the W side of the bight.

(299) **Allouez Bay** is a very shallow bay that extends SE from Superior Bay S of Superior Entry and is enclosed on the E by **Wisconsin Point.**

(300) **Nemadji River** flows from **Moosecamp Lake,** about 40 miles above Superior, and empties into the W side of Superior Bay opposite Superior Entry. In October 1982, a depth of 4½ feet was available for 5 miles above the mouth, thence in 1976, 2 feet above that point.

(301) **St. Louis River** flows into the W side of Superior Bay near its N end through a narrow gap between **Rices Point** on the N and **Connors Point** on the S. **St. Louis Bay** is a widening in the river that extends from these points to **Grassy Point,** 3 miles SW. **Howards Bay** is a narrow inlet that leads SE from St. Louis Bay for 1 mile on the W side of Connors Point.

(302) Above Grassy Point, the river again widens, covers a large shallow area, and is divided by points and islands into a number of irregularly shaped bays and inlets. **Clough Island,** the largest in this area, encloses the N side of **Spirit Lake,** a section of the river mostly isolated by islands. **Minnesota Channel,** the dredged channel through this area, follows the Minnesota shore for 2 miles W from Grassy Point, thence turns S between Clough Island and the mainland, and thence turns E on the S side of Clough Island to the head of the dredged channel.

(303) Two **safety zones** have been established in segments of the St. Louis River just south of Clough Island. Navigation of vessels through the zones and swimming within the zones are prohibited. (See **33 CFR 165.905**, chapter 2, for limits and regulations.)

(304) About 1.5 miles W of Grassy Point, a small-craft channel with a controlling depth of about 3 feet extends S from Minnesota Channel, and on the E side of Clough Island, joins a curving natural channel that leads S to join with the natural channel of St. Louis River SE of Clough Island.

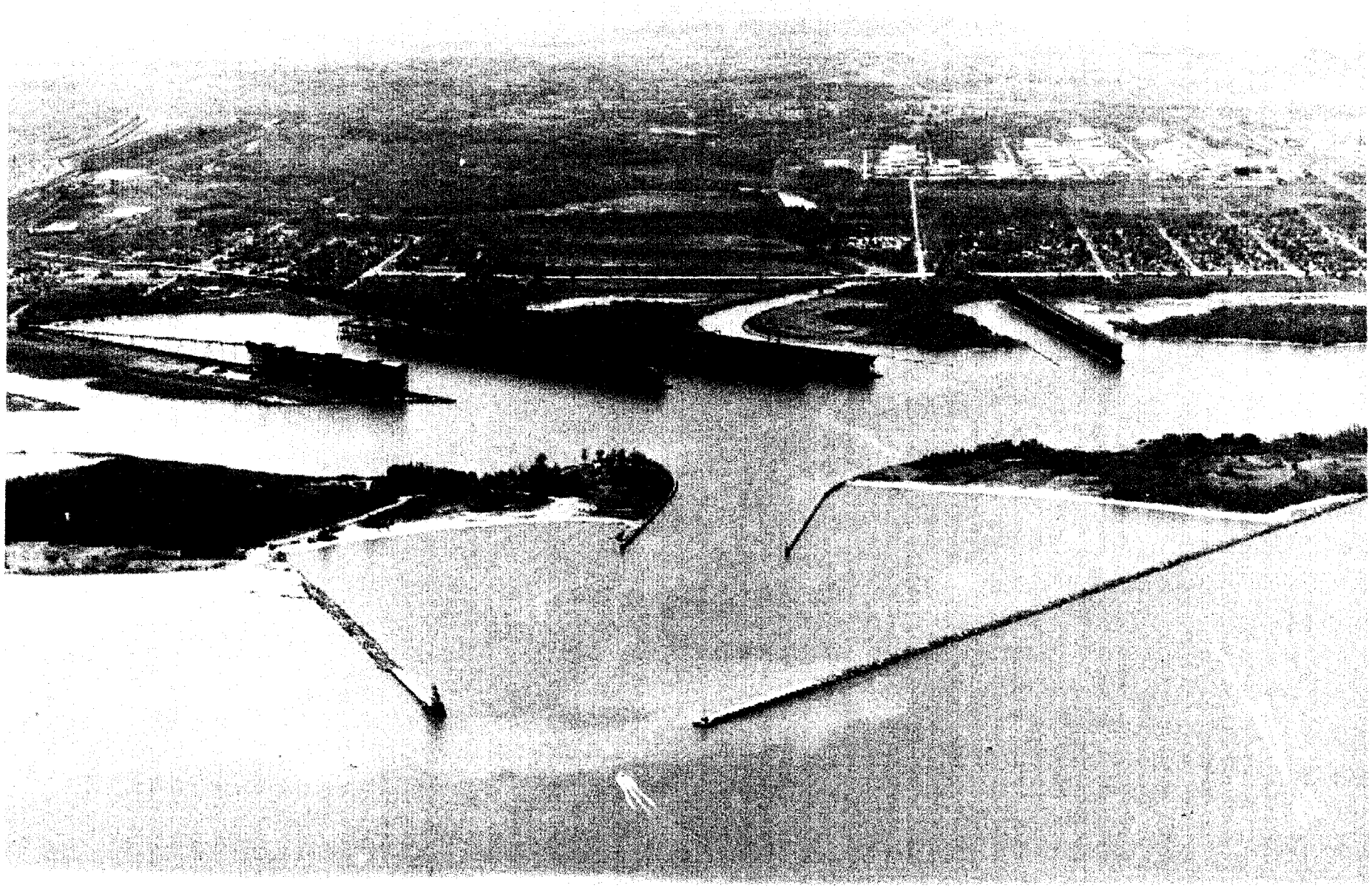
(305) Above Clough Island, the natural channel of the St. Louis River is navigable for varying drafts to just above **Fond du Lac,** about 8 miles above Clough Island. The river is practically a level pool at ordinary stages to the foot of the rapids just above Fond du Lac. The channel in this reach is well marked by buoys, and vessels of suitable draft should have no difficulty navigating it. A wreck, covered about 2½ feet, is on the E side of the river at **Oliver,** about 3.8 miles above Clough Island.

(306) At Fond du Lac, a mud island and shoal extends off the mouth of Mission Creek. A very narrow channel along the S shore affords access for about 7 feet draft to the river above the creek. The distance from the Burlington Northern Railway bridge at Grassy Point to Fond du Lac is about 13.2 miles by the main channel and about 11.8 miles by the cut-off channels.

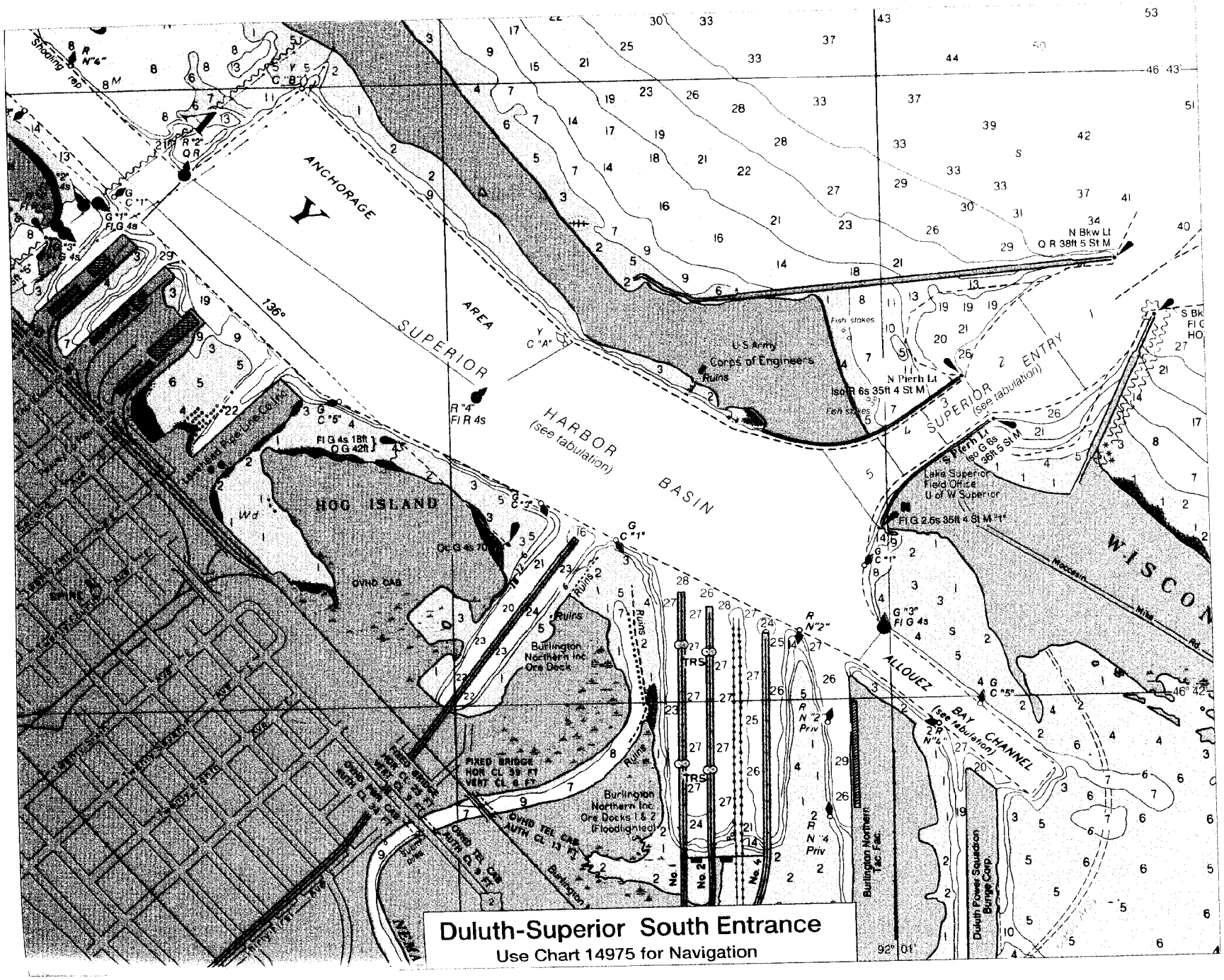
(307) **Channels.**–One Federal project encompasses Duluth-Superior Harbor. Channels have been dredged in Superior Entry, Duluth Ship Canal, Superior Bay, Allouez Bay, Howards Bay, St. Louis Bay, and St. Louis River as far as the S side of Clough Island.

(308) **Superior Harbor** is entered from deep water in Lake Superior between converging breakwaters and parallel piers to the S end of Superior Bay. The outer ends of the breakwaters and piers are marked by lights. Federal project depths are 31 to 27 feet in Superior Entry, thence 27 feet in Superior Harbor Basin and anchorage area, Allouez Bay Channel, and Superior Front Chan-

**Superior, WI**

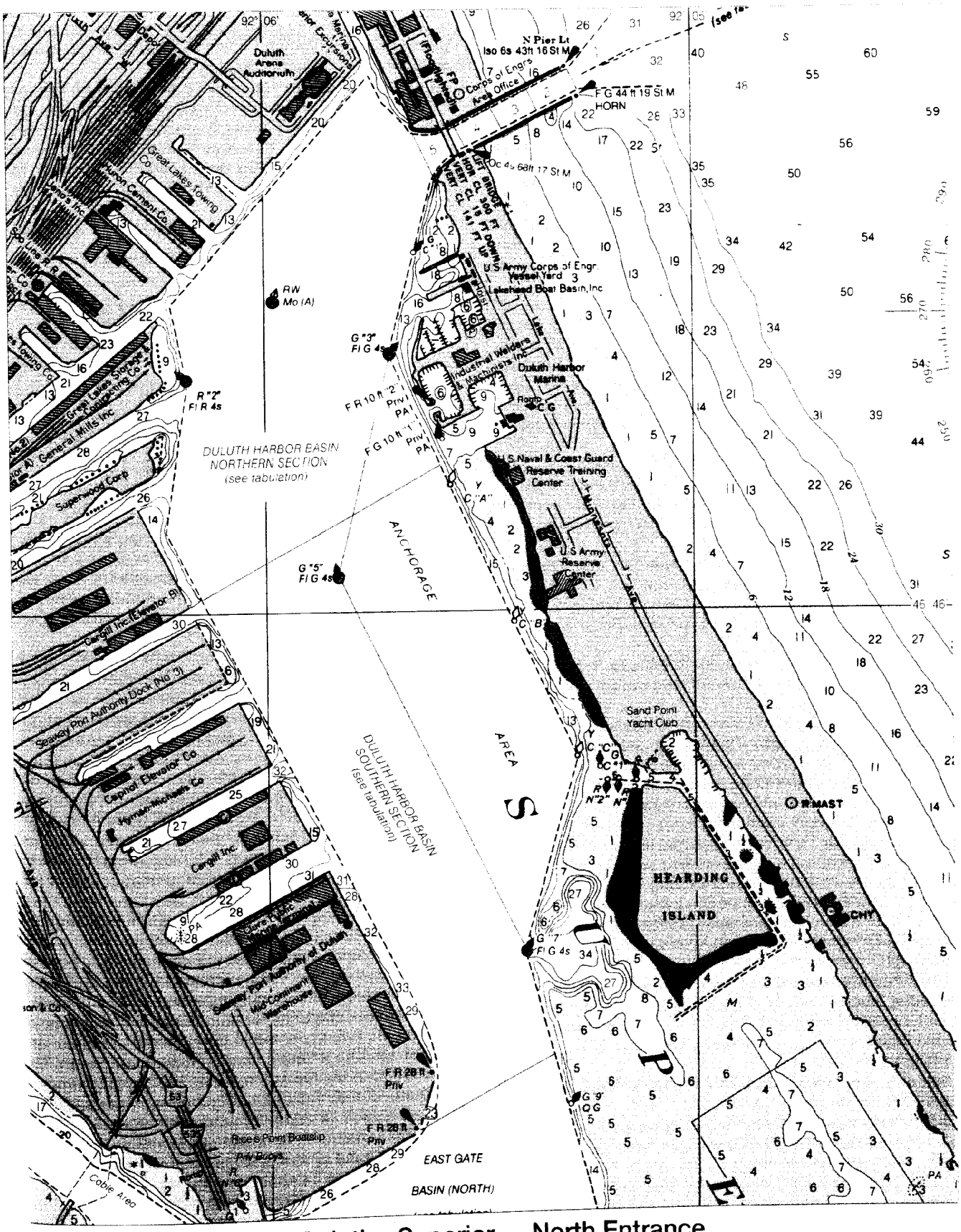


Duluth, MN
N




# Duluth-Superior South Entrance

Use Chart 14975 for Navigation




# Duluth - Superior - North Entrance

Use Chart 14975 for Navigation

nel. (See Notice to Mariners and latest editions of charts for controlling depths.)

(309) **Duluth Harbor** is entered from deep water in the lake between parallel piers to the N end of Superior Bay. The outer ends of the piers are marked by lights; a fog signal and a radiobeacon are at the S light. **Duluth Harbor Basin Traffic Lighted Buoy,** 0.45 mile SW of Duluth Harbor South Breakwater Inner Light, should be left to starboard by all inbound and outbound vessels except those proceeding to or from the docks on the NW side of the basin, in which cases the regular navigation rules apply. Federal project depths are 32 to 28 feet in Duluth Ship Canal, 28 to 27 feet in Duluth Harbor Basin and anchorage area, and 27 feet in East Gate Basin. (See Notice to Mariners and latest editions of charts for controlling depths.)

(310) In St. Louis Bay and River the Federal project depths are 27 feet in West Gate Basin and Howards Bay channel, 27 feet in North Channel E section and 21 feet in the W section, 20 feet in 21st Avenue West Channel, 27 feet in South Channel E section and Cross Channel, 23 feet in South Channel W section and Upper Channel, and 23 feet in Minnesota Channel E section with 20 feet in the W section. (See Notice to Mariners and latest editions of charts for controlling depths.)

(311) Water level information for Duluth Harbor may be obtained by contacting Duluth Army Corps of Engineers by telephone at 218-720-5261 or radiotelephone channel 16 between 0730 and 1600, Monday through Friday. Water levels are given in whole inches above or below chart datum.

(312) All the dredged channels in the harbor are well marked by lighted and unlighted buoys and lighted ranges.

(313) Vessels drawing more than 16 feet are cautioned against navigating within 50 feet of piers at Superior Entry because of stone riprap.

(314) In Duluth Ship Canal vessels drawing more than 20 feet should not navigate within 20 feet of the piers because of stone riprap.

(315) **Anchorages.**–Two deep-draft anchorages in Superior Bay, one in the SE corner of Duluth Harbor Basin and one in the N corner of Superior Harbor Basin, are marked by lighted and unlighted buoys. The Duluth Harbor Basin anchorage has fair to good holding ground but is narrow and presents problems in E or W winds. The anchorage is only suitable for short term delays such as: awaiting immediate berth, boarding parties, and inspections. Masters should be prepared to maneuver their vessel to safety in the event of sudden wind shifts. Vessels awaiting berths at Duluth frequently anchor E of Duluth Harbor South Breakwater Outer Light. The Superior Harbor Basin anchorage is subject to shoaling at the S end, and a submerged pipeline crosses the NW end of the anchorage.

(316) A special anchorage is on the E side of Superior Bay SE of **Hearding Island.** (See **33 CFR 110.1 and 110.77a,** chapter 2, for limits and regulations.)

(317) **Caution.**–A sunken wreck is 0.9 mile ENE of the entrance to Duluth Ship Canal.

(318) The area immediately ESE of Duluth Harbor Basin Traffic Lighted Buoy is subject to shoaling.

(319) **Local magnetic disturbance.**–Differences from normal variation of from 001°E to 005°E have been observed in the lake about about 10 miles from Duluth.

(320) **Currents.**–Currents resulting from fluctuations of the water level of Lake Superior are prevalent in Duluth Ship Canal. The currents set in or out of the canal as the lake rises or falls and are usually of moderate strength and short duration. On rare occasions, a large seiche will produce a current of up to 6 mph for a few minutes, followed by a reverse current perhaps equally strong. The stronger currents cause some inconvenience to navigation, but nothing serious unless accompanied by storms.

(321) When a current setting out of the canal meets a heavy sea from the NE, it increases the wave height, creating a choppy and turbulent sea and making entrance by vessels somewhat difficult and dangerous. Instances have been reported of vessels being thrown against the piers under these conditions. In ordinary storms, however, this danger seems to be slight, and failure to make the entrance has been rare.

(322) A LIGHTED Current Meter has been installed on Duluth Ship Canal Bridge structure.

| Light codes | Directions | Current (Speeds in Knots) |
|---|---|---|
| yellow | inbound/outbound | less than .75 |
| Steady red | inbound | .75 – 1.25 |
| Flashing red | inbound | greater than 3.0 |
| Steady green | outbound | .75 – 1.25 |
| Flashing green | outbound | greater than 3.0 |

(323) Currents frequently set through Superior Entry, usually simultaneous with and in the same direction as those at Duluth Ship Canal. However, they are usually of less velocity, due to the greater length of the canal and the consequent smaller degree of slope for any difference of water level between the lake and harbor.

(324) **Caution.**–A flashing amber signal light on the W side of the fixed span of Duluth Ship Canal bridge is operated by the city of Duluth for the purpose of warning outbound vessels within Duluth Harbor Basin of the approach from Lake Superior of inbound vessels exceeding 300 gross tons and barges or scows exceeding (light) 100 displacement tons. The light is not intended to regulate traffic, but to assist outbound vessels in complying with the regulation which prohibits the passing in Duluth Ship Canal by vessels of the sizes mentioned and noted in **33 CFR 162.110.** (See chapter 2.) Subject to mechanical failure or reasons beyond control, the bridge operators will cause the amber light to commence flashing when, in their opinion, a vessel or craft of the tonnage above stated will enter Duluth Ship Canal from Lake Superior within 15 minutes, the flashing to continue until the incoming vessel has cleared the canal. Masters are cautioned that the signal light does not relieve them of responsibility to observe the passing regulation or of any other responsibility inherent in their duties relating to maneuvering, signaling, or other functions.

(325) **Weather, Duluth and vicinity.**–Duluth, MN, is located at the extreme southwestern corner of Lake Superior in northeastern Minnesota just north of the Wisconsin/Minnesota state border. The location averages only two days each year with maximum temperatures in excess of 90°F (32.2°C). July is the warmest month with an average high of 76°F (24.4°C) and an average minimum of 54°F (12.2°C). January is the coolest month with an average high of 17°F (-8.3°C) and an average minimum of -2°F (-18.9°C). The highest temperature on record for Duluth is 97°F (36.1°C) recorded in July 1988 and the lowest temperature on record is -39°F (-39.4°C) recorded in January 1972. About 186 days each year experience temperatures below 32°F (0°C) and an average 62 days each year records temperatures below 5°F (-15°C). Every month has seen temperatures at or below 35°F (1.7°C) and every

## Structures across Duluth-Superior Harbor, St. Louis River, and Nemadji River
### *Miles above Duluth Harbor North Pier Light
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Low Water Datum | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | | |
| 1 | Duluth Ship Canal bridge | Highway | 0.25 | | | 300 | 15 | Vertical lift. Clearance up 141 feet. Notes 1 and 3. |
| | **St. Louis Bay and River** | | | | | | | |
| 2 | John A. Blatnik (I—535) bridge | Highway | 2.74 | | | 460 | 123 | Fixed. |
| 3 | I—535 bridge (Howards Bay) | Highway | | | | 150 | 103 | Fixed. |
| 4 | Bong Bridge | Highway | 5.20 | | | 400 | 120 | Fixed. |
| 5 | Burlington Northern Ry. (Grassy Point) bridge | Railroad | 5.44 | 175 | 175 | | 12 | Swing. Notes 2 and 4. |
| 6 | Overhead cable | Power | 5.73 | | | | 143 | |
| 7 | Duluth, Missabe & Iron Range Ry. (Oliver) bridge | Highway & Railroad | 13.91 | 125 | 125 | | 22 | Swing. Note 2. |
| 8 | Overhead cable | Telephone | 18.99 | | | | 24 | |
| 9 | Fond du Lac bridge | Highway | 19.00 | | | 116 | 23 | Fixed. |
| | **Nemadji River** | | | | | | | |
| 10 | Overhead cable | Telephone | 0.32 | | | | 13 | Note 5. |
| 11 | Burlington Northern Ry. bridge | Railroad | 0.33 | | | 59 | 10 | Fixed. |
| 12 | Overhead cable | Telephone | 0.44 | | | | 9 | |
| 13 | U.S. Route 2 bridge | Highway | 0.45 | | | 25 | 9 | Fixed. |
| 14 | Overhead cable | Power | 0.46 | | | | 34 | |
| 15 | Overhead cable | Telephone | 1.20 | | | | 26 | |
| 16 | Chicago & North Western Ry. bridge | Railroad | 1.21 | | | 70 | 26 | Fixed. |
| 17 | Overhead cable | Power | 1.85 | | | | 15 | |
| 18 | Bardon Ave. bridge | Highway | 5.00 | | | 16 | 11 | Fixed. |
| 19 | Soo Line Ry. bridge | Railroad | 7.40 | | | | 23 | Fixed. |

Note 1.—See **33 CFR 117.1 through 117.59 and 117.661,** chapter 2, for drawbridge regulations.

Note 2.—See **33 CFR 117.1 through 117.59, 117.669, and 117.1083,** chapter 2, for drawbridge regulations.

Note 3.—With the bridge in the down position, the vertical clearance is 16 feet for the center 192 feet of the span reducing to 14 feet at the ends of the span. The bridgetender monitors VHF–FM channel 16, and works on channel 13; call sign, KAN–388.

Note 4.—Fixed spans adjoining each end of the draw span, outside the channel limits, have a horizontal clearance of 64 feet and a vertical clearance of 13 feet.

Note 5.—Mileages in Nemadji River are above the river mouth.

month except July has recorded temperatures at or below freezing (0°C).

(326) The average annual precipitation for Duluth is 30.58 inches (777 mm). An annual maximum occurs during the summer, due mainly to convective activity, and a marked dry period occurs during the winter months. Precipitation falls on about 223 days each year. The wettest month is June with 4.08 inches (104 mm) and the driest, February, averages only 0.82 inches (20.8 mm). An average of 34 thunderstorm days occur each year with June, July and August being the most likely months. Snow falls on about 119 days each year and averages about 81 inches (2057 mm) each year. November, December, January, and March each average over 12 inches (305 mm) in a given year. In November 1950 and again in December 1991, nearly 24 inches (610 mm) of snow fell in one 24-hour period. Snowfall amounts of greater than one foot (305 mm) in 24-hours have fallen in each month November through April. About 14 days each year has a snowfall total greater than 1.5 inches (38 mm) and snow has fallen in every month except June, July, and August. Fog is present on average 132 days each year and is more prevalent during the late summer and early autumn.

(327) The prevailing wind direction in Duluth is the northwest. Winter through early summer is the windiest period and a maximum gust of 62 knots occurred in May 1981 and again in March 1985.

(328) (See page T-15 for **Duluth climatological table**.)

(329) **Towage.**–Tugs to 1,250 and 1,200 hp are available from Great Lakes Towing Co., and North American Towing Co., respectively. Arrangements for the Great Lakes Towing Co. tugs are made through the dispatcher in Cleveland at 800-321-3663 or on VHF-FM channels 16, 10, 12, and 18A via remote antenna. The tugs' VHF-FM channels include 16, 6, 12, 14, and 18A. The North American Towing Co. dispatcher is reached at 218-722-1852 or on VHF-FM channels 16 and 14. The tugs can be contacted initially on VHF-FM channel 16. Vessels are usually met inside the harbor, but during adverse winds they are met outside the entrance to Duluth Ship Canal.

(330) Duluth and Superior are **customs ports of entry.**

(331) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(332) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) A total of six modern hospitals are in Duluth and Superior.

(333) **Coast Guard.**–Duluth Coast Guard Station is on the W side of Minnesota Point, 0.5 mile S of Duluth Ship Canal. A Coast Guard **Marine Safety Office** is in Duluth. (See appendix for address.)

(334) **Harbor regulations.**–A **speed limit** of 8 mph (7 knots) is enforced in Duluth-Superior Harbor. (See **33 CFR 162.110,** chapter 2, for harbor regulations.)

(335) **Wharves.**–Duluth-Superior Harbor is well equipped with facilities for handling all types of cargo. The major commodities handled in the port are grain, iron ore, coal, limestone, cement, and general cargo. Only the deep-draft facilities are here described. (For complete information on the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operator.) Water, electrical shorepower, rail, and highway connections are available at many of the wharves and docks in the harbor.

(336) **Facilities in Superior Bay at Duluth:**

(337) **Huron Cement Duluth Plant Dock:** (46°46′35″N., 92°06′10″W.); 850-foot face; 17 to 25 feet alongside; deck height, 6 feet; handles bulk cement.

(338) **Cutler-Magner Co., Salt Plant Pier**: (46°46′29″N., 92°06′28″W.); 900-foot face; 24 feet alongside; deck height, 6 feet; one traveling bridge crane, unloading rate 200 tons per hour; handles dry bulk rock salt, calcium chloride, and evaporated salt.

(339) **Great Lakes Storage and Contracting Co., Dock No. 2**: (46°46′23″N., 92°06′25″W.); 1,600 feet of berthing space; 11 to 26 feet alongside; deck height, 6 feet; handles general cargo.

(340) **General Mills Elevator A Wharf**: (46°46′15″N., 92°06′32″W.); 2,281-foot face; 28 feet alongside; deck height, 6 feet; handles grain.

(341) **Cargill Elevator B Dock**: (46°46′05″N., 92°06′19″W.); 1,050-foot face; 27 feet alongside; deck height, 5 feet; handles grain.

(342) **Seaway Port Authority of Duluth Dakota Pier**: across slip S of Cargill Elevator B Dock; 2,030 feet of berthing space along N face; 21 to 24 feet alongside; deck height, 5 feet; mooring for miscellaneous vessels.

(343) **Multifoods Elevator Co. Dock**: (46°45′48″N., 92°06′16″W.); 1,736 feet of berthing space; 12 to 28 feet alongside; deck height, 6 feet; handles grain; operated by International Multifoods Corp.

(344) **Azcon Corp. Dock**: S side of Multifoods Elevator Co. Dock; 1,586-foot face; 26 feet alongside; deck height, 6 feet; cranes to 100 tons; handles ferrous scrap metal.

(345) **Cargill Elevator C. Dock**: across slip S of Hyman Michaels Co. Dock: 1,200 feet of berthing space; 28 feet alongside; deck height, 5 feet; handles grain.

(346) **Arthur M. Clure Public Marine Terminal**: (46°45′26″N., 92°05′45″W.); 1,600-foot N face, 3,364-foot SE face, 700-foot S face; 27 to 30 feet alongside; deck height, 8 feet; cranes to 150 tons; handles general cargo, finished steel, scrap metal, edible and commercial grade fats and oils, refrigerated foodstuffs, and cement, owned by Seaway Port Authority of Duluth and operated by North Central Terminal Operators, Inc., Md-Continent Warehouse Co., and St. Lawrence Cement Co.

(347) **Facilities in St. Louis Bay at Duluth**:

(348) **Duluth, Missabe and Iron Range Railway, Ore Dock No. 6**: 1.3 miles W of SW point of Rices Point; 3,816 feet of berthing space; 28 feet alongside; deck heights, low deck 6 feet, top deck 84½ feet; handles iron ore and iron ore pellets.

(349) **Hallett Dock No. 5**: (46°44′47″N., 92°08′00″W.); 2,400-foot face; 22 to 27 feet alongside; deck height, 5 feet; handles dry bulk materials including coal and fertilizer.

(350) **Facilities in St. Louis River W of Grassy Point**:

(351) **C. Reiss Coal Co. Duluth Dock**: 0.2 mile W of Grassy Point; 2,854-foot face; 29 feet alongside; deck height, 4 feet; handles dry bulk materials including coal, limestone, and salt.

(352) **Hallett Dock No. 6**: 0.9 mile W of Grassy Point, 2,060-foot face; 23 feet alongside; deck height, 5 feet; handles miscellaneous dry bulk materials including coal and calcium chloride.

(353) **Facilities in St. Louis Bay at Superior**:

(354) **Standard Oil Superior Terminal Dock**: W side of slip 0.9 mile WSW of Connors Point; 420 feet of berthing space; 26 feet alongside; deck height, 4 feet; handles petroleum products.

(355) **Superior Midwest Energy Terminal**: 0.6 mile WSW of Connors Point: 1,200 feet of berthing space; 27 feet alongside; deck height, 11 feet; handles coal, operated by Midwest Energy Resources Co.

(356) **Archer-Daniels-Midland Superior Terminal Dock**: E side of slip 0.4 mile WSW of Connors Point; 1,254-foot face; 30 feet alongside; deck heights, 9 and 13 feet; handles grain.

(357) **Globe Elevator Dock**: E side of slip 0.2 mile WSW of Connors Point; 710 feet of berthing space; 28 feet alongside; deck height, 4 feet; handles grain; operated by Peavey Grain Co.

(358) **Facilities in Howard Bay**:

(359) **Harvest States Cooperatives No. 1 Elevator Dock**: center section E side of slip 0.3 mile SE of Globe Elevator Dock; 1,000 feet of berthing space; 24 feet alongside; deck height, 6 feet; handles grain.

(360) **Harvest States Cooperatives No. 1 Gallery Dock**: outer section E side of slip 0.3 mile SE of Globe Elevator Dock; 591 feet of berthing space; 30 feet alongside; deck height, 6 feet; handles grain.

(361) **Harvest States Cooperatives No. 2 Hughitt Slip Dock**: W side of slip 0.4 mile SE of Globe Elevator Dock; 1,175 feet of berthing space; 27 feet alongside; deck height, 5 feet; handles grain.

(362) **Facilities in Superior Bay at Superior**:

(363) **Meehan Seaway Service, Ltd. Dock**: (46°44′20″N., 92°05′06″W); 1,000-foot face; 27 feet alongside; deck height, 5 feet; handles grain, general cargo and steel products.

(364) **Connors Point Dock**: (46°44′17″N., 92°04′53″W.); 794-foot face; 28 feet alongside; deck height, 4 feet; handles grain; operated by Peavey Grain Co.

(365) **CLM Lime Plant Dock: S side of slip 0.45 mile SE of Connor's Point Dock**: 570-foot face; 24 feet alongside; deck height, 6 feet; handles limestone, coal, and salt.

(366) **Huron Cement Superior Plant Dock**: 0.55 mile SE of Connor's Point Dock; 900-foot face; 27 feet alongside; deck height, 5 feet; handles cement clinker, gypsum, and cement.

(367) **Peavey Grain Co. Elevator M Dock**: (46°42′40″N., 92°02′44″W.); 1,320 feet of berthing space; 28 feet alongside; deck height, 5 feet; handles grain.

(368) **Burlington Northern, Ore Dock No. 1**: (46°42′00″N., 92°01′29″W.); 2,244 feet of berthing space along ore pockets on

W and E sides; 27 feet alongside; deck heights, low deck 6 feet, top deck 81 feet; handles iron ore pellets and iron ore.

(369) **Burlington Northern, Ore Dock No. 2**: immediately E of Ore Dock No. 1; 2,100 feet of berthing space along ore pockets on W and E sides; 27 feet alongside; deck heights, low deck 6 feet, top deck 81 feet; handles iron ore and coal.

(370) **Burlington Northern, Ore Dock No. 5**: (46°41′55″N., 92°01′07″W.); 1,675 feet of berthing space; 16 to 27 feet alongside; deck height, 4 feet; open storage for over 5 million tons of material; 18 shuttle conveyors have a combined vessel-loading rate of 13,000 tons per hour; shipment of iron ore pellets; owned and operated by Burlington Northern, Inc.

(371) **Supplies.**–Marine supplies, provisions, Bunker C and diesel oils by barge and tank truck, potable water, and other supplies are available at Duluth and Superior.

(372) **Repairs.**–Two companies in the harbor have docking facilities for making repairs to deep-draft vessels, and three other companies have shops and make repairs to vessels at their berths. Fraser Shipyard, Inc., at the head of Howards Bay, has three graving docks. The largest has a length of 800 feet on the keel blocks and 831 feet overall, a width of 85 feet at the top of the entrance and 80 feet at the keel blocks, and a depth of 18½ feet over the sill. Repairs of all types are made at these docks. Cranes to 120 tons are available. Shafts to 36 feet long can be produced.

(373) **Small-craft facilities.**–Small-craft facilities are on the NE side of Duluth Harbor Basin, on the W side of Minnesota Point 0.5 mile S of Duluth Ship Canal, on Barkers Island 1.6 miles NW of Superior Entry, at the N end of Duluth Harbor Basin in the slip NE of the Duluth Arena-Auditorium, and on the W side of the river opposite Clough Island. The marina on Minnesota Point provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and most marine supplies. A 50-ton mobile hoist can handle 70-foot craft with a 19-foot beam and a draft of 7 feet for complete hull, engine, and electronic repairs.

(374) A marina on Barkers Island has berths, gasoline, diesel fuel, water, electricity, a launching ramp, and marine supplies. A mobile hoist can handle craft to 30 tons for complete hull and engine repairs. In September 1982, 8½ feet was reported in the entrance channel and alongside the docks. The entrance channel is marked by private lights and lighted and unlighted buoys.

(375) **Communications.**–Duluth and Superior have good highway and rail connections. Duluth International Airport is 7 miles W of the harbor.

(376) **Chart 14966.**–From Duluth Ship Canal NE for 18.5 miles to Knife River, the shore is bold and rocky. Deep water is within 0.25 mile of shore. **Stony Point** (46°55.5′N., 91°49.0′W.), 2.5 miles SW of Knife River, is prominent. A lighted red and white checkered tank on high ground 3 miles W of Stony Point is prominent.

(377) **Local magnetic disturbance.**–Differences from normal variation of from 002°W to 018°E have been observed in the vicinity of Stony Point.

(378) **Knife River, Minn.,** is a village just above the mouth of **Knife River,** 18.5 miles NE of Duluth Ship Canal. A small-craft harbor, used principally by recreational craft, is 0.4 mile S of the river mouth on the N side of **Granite Point.**

(379) Knife River is not navigable. An offshore dock on the S side of the river mouth is in ruins, hazardous, and useless for dockage. **Knife Island** is 0.3 mile SE of the river mouth. A shoal with rocks awash extends about 950 feet WSW from the island to within about 500 feet of Granite Point. The rest of the island can be approached within about 350 feet.

(380) **Knife River Harbor Entrance Light** (46°56.6′N., 91°46.7′W.), 31 feet above the water, is shown from a white column with a square green daymark on the outer end of the breakwater at Granite Point.

(381) **Channels.**–A breakwater that extends from Granite Point protects the entrance to the harbor from the SE. A dredged entrance channel leads from deep water in Lake Superior on the N side of the breakwater to an inner channel about 0.2 mile long. In June 1997, the controlling depth was 6½ feet in the N half and about 1 foot in the S half of the channel. Local knowledge is advised.

(382) **Small-craft facilities.**–A county-owned marina in the small-craft harbor provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 20-ton hoist is available for hull and engine repairs. The marina monitors VHF-FM channel 16.

(383) From the mouth of Knife River, the shore extends NE for 7 miles to Two Harbors and is deep-to. No landings are in this stretch. A rounded promontory about 200 feet high forms the W side of Agate Bay on which Two Harbors is located. A lighted radio mast on the promontory and two tanks and a stack NNE of town are prominent.

(384) **Two Harbors, Minn.,** is a town about 7 miles NE of Knife River on the N side of **Agate Bay,** a natural indentation about 0.75 mile long and 0.5 mile wide. Two Harbors is an important ore shipping point, and the bay is a harbor of refuge.

(385) **Two Harbors Light** (47°00.8′N., 91°39.8′W.), 78 feet above the water, is shown from a red square tower on a dwelling on the E point of the harbor.

(386) **Prominent features.–Pork City Hill,** (47°00′45″N., 91°41′15″W.) and **Silver Cliff,** (47°04′10″N., 91°35′30″W.) are excellent radar targets when approaching Two Harbors.

(387) **Channels.**–The harbor is entered from Lake Superior N between a detached breakwater on the W side and a breakwater that extends SW from the E point of the harbor. The outer ends of the breakwaters are marked by lights; a fog signal is at the E light. A maneuvering area has been dredged in the E part of the harbor. Buoys mark the N and E limits of the area. In May 1998, the maneuvering area had depths of 25-30 feet.

(388) In March 1987, a submerged obstruction covered 30 feet was reported about 700 feet N of the E breakwater light, in about 47°00′45.3″N., 91°40′09.4″W.

(389) **Towage.**–Tugs are available from Duluth. (See Towage under Duluth.)

(390) **Wharves.**–Two Harbors has two deep-draft facilities on the W side of Agate Bay. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operator.) The facilities described have highway and rail connections.

(391) **Duluth, Missabe and Iron Range Railway, Ore Dock No. 1:** 1,600 feet NE of W breakwater light; 1,406 feet of berthing space along NE and SW sides; 28 feet alongside; deck heights, low deck 6 feet, top deck 75 feet; handles iron ore, iron ore pellets, and bunkering vessels.

(392) **Duluth, Missabe and Iron Range Railway, Ore Dock No. 2:** immediately SW of Ore Dock No. 1; 1,432 feet of berthing space along NE and SW sides; 28 feet alongside; deck heights, low deck 6 feet, top deck 80 feet; handles iron ore, iron ore pellets, and bunkering vessels.

(393) **Small-craft facilities.**–Paved launching ramps are available in the harbor and gasoline and supplies are available nearby.

Ruins of fishing docks and foul bottom are along the E side of the harbor basin. Caution is advised in the area. Ruins covered 5 feet are on the N side of the W end of the W breakwater.

(394) From Two Harbors, the shore is bold for 27 miles NE to Silver Bay Harbor. There is little shelter along this stretch, and several dangers are close to the shore.

(395) **Local magnetic disturbance.**–Differences from normal variation of about 007°E have been observed near **Talmadge River** and **French River,** about 12 miles NE of Duluth.

(396) **Burlington Bay,** 1 mile NE of Agate Bay, is about 1 mile wide and indents the shore about 0.6 mile. The bay is protected from SW winds by the point of land that separates it from Agate Bay, but is subject to wash from that direction. The bay is partially protected from NE storms by the E point of land, but those storms can be so severe, with waves of such great fetch, that the sea rolls into the bay and makes it unsafe for vessels.

(397) A rocky ledge covered 6 feet is 0.2 mile offshore at the mouth of **Silver Creek,** 4.2 miles NE of Two Harbors Light.**Encampment Island,** 3.2 miles NE of Silver Creek, is connected to the shore by a shoal with depths less than 12 feet. About 4 miles NE of Encampment Island, a group of rocks awash extends 0.4 mile from shore.

(398) **Local magnetic disturbance.**–Differences from normal variation of 005°E have been observed near Encampment Island.

(399) **Gooseberry River** flows into Lake Superior about 13.5 miles NE of Two Harbors. An extensive gravel beach extends S from its mouth. Good water extends up to the beach. **Gooseberry Reef,** reported covered 4 feet, is 0.5 mile from shore 1 mile S of the river.

(400) **Local magnetic disturbance.**–Differences from normal variation of from 004°E to 008°E have been observed near Gooseberry River.

(401) At the mouth of **Split Rock River,** a small indentation offers protection from W to N winds and limited protection from NE and SW winds. **Corundum Point** (47°11.5′N., 91°22.9′W.), 1.5 miles NE of Split Rock River, offers no protection. Abandoned Split Rock Light, 1 mile NE of Corundum Point, is a buff-colored octagonal tower with a white horizontal band. The tower is part of Split Rock Lighthouse State Park. The light is occasionally lighted for exhibition purposes.

(402) **Local magnetic disturbance.**–Differences from normal variation of from 011°W to 011°E have been observed in the vicinity of Corundum Point.

(403) **Little Two Harbors** is a small bay between Corundum Point and the abandoned Split Rock Light. A detached rocky reef, covered 22 feet, is 0.5 mile E of Corundum Point. The reef drops off suddenly to deep water on its E side and is a danger to small craft due to the swell or wave thrown up by the steep E face.

(404) **Charts 14966, 14967.–Beaver Bay,** about 50 miles NE of Duluth Ship Canal, is about 0.7 mile wide and indents the shore about 0.3 mile. The 16-foot depth contour is within 30 to 200 feet of shore. Large boulders are in all parts of the bay. The shore of the bay is bordered by bluffs that rise 75 to 200 feet above the lake. The bay affords some shelter from S, W, and N storms, but is open and unprotected to NE, E, and SE. The most dangerous storms at this end of the lake are from NE, the seas having a fetch of more than 250 miles. Two piers are on the N side of the bay. The E pier has a depth of 5 feet at the outer end, and the W pier 9 feet at the outer end.

(405) **Silver Bay Harbor** is a private harbor developed by the Reserve Mining Company about 52 miles NE of Duluth Ship Canal. The stacks on the powerhouse just N of the harbor are prominent.

(406) The harbor is about 1 mile long and 0.25 mile wide with depths of at least 30 feet over most of its area. The harbor is protected from the E and NE by **Beaver Island** and a breakwater that extends NW to shore from the N end of the island, and from the SW by **Pellet Island** and a breakwater that extends W from it to the shore. Beaver Island and Pellet Island are each marked on the NE side by a private light. In 1972, the controlling depth was 28 feet alongside the loading dock on the NW side of the harbor. A private light is off the SW end of the dock, and a radiobeacon is about 900 feet NE of the light. Shoaling to depths of less than 30 feet exists along the shore SW of the dock. A private lighted buoy is S of Beaver Island, a private buoy marks the outer edge of a shoal extending W from Beaver Island, and private lighted buoys mark the limit of deep water at the S end of the harbor.

(407) **Wharf.**–Silver Bay has one deep-draft wharf on the NW side of the harbor. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for this facility are reported depths. (For information on the latest depths, contact the operator.)

(408) **Reserve Mining Co. Dock:** 2,400-foot face; 30 feet alongside; deck height, 8½ feet; iron ore pellets, coal, diesel fuel, Bunker C, grinding rods, and bunkering vessels.

(409) **Chart 14967.**–From Silver Bay Harbor the shore extends NE for about 23 miles to Taconite Harbor. The shore is bold and rocky, with cliffs and steep slopes. Numerous small points and inlets afford limited shelter. There are no outlying obstructions, and the shore can be approached within 0.5 mile. **Baptism River,** 5 miles NE of Silver Bay Harbor, is the largest stream flowing into this stretch, and the area around its mouth is a State park. A lighted radio mast about 4 miles NE of Silver Bay Harbor near the summit of **Palisade Head** is prominent.

(410) **Local magnetic disturbance.**–Differences from normal variation of from 004°W to 006°W have been observed in the vicinity of Baptism River and Palisade Head.

(411) **Taconite Harbor** is a private harbor maintained by the Erie Mining Company about 75 miles NE of Duluth at the mouth of **Two Island River.** The harbor is a basin, about 0.8 mile long and 0.3 mile wide, enclosed by **Gull Island, Bear Island,** and a series of breakwaters. Three lighted stacks at the powerhouse at the N end of the harbor are prominent.

(412) Gull Island, Bear Island, the breakwater between them, and the breakwater that extends NE from Bear Island protect the harbor from the SE. A breakwater that extends SE from shore at the N end of the harbor protects the harbor from the NE. The harbor is entered N from Lake Superior on the W side of Gull Island and is exited between the breakwaters at the NE end of the harbor.

(413) The entrance to the harbor is marked by lighted buoys, lights, and a **028°** lighted range. The harbor exit is marked by lights on the outer ends of the breakwaters. Shoals at the N end of the harbor and off the end of the breakwater on the S side of the harbor exit are marked by lighted and unlighted buoys. All the aids in the harbor are private except the radiobeacon.

(414) In 1972, the controlling depths were 27 feet in the entrance channel, 27 feet along the face of the dock on the NW side of the harbor, and 29 feet in the exit channel. Depths inside the harbor range from 27 feet to over 50 feet.

(415) **Caution.**–In 1975, an anchor was lost in the entrance channel, about 600 feet N of the light on the E side of the entrance.

(416) **Wharf.**–Taconite Harbor has one deep-draft facility on the NW side of the harbor. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facility described are reported depths. (For information on the latest depths, contact the operator.)

(417) **Erie Mining Co. Dock:** 1,710-foot face; 30 feet alongside; deck height, 10½ feet; handles iron ore pellets, petroleum products, and bunkering vessels.

(418) From Taconite Harbor, the shore extends NE for 31 miles to Grand Marais. Steep slopes and cliffs in this reach rise to elevations over 900 feet above the lake within 1 to 2 miles of shore. **Carlton Peak,** 4.5 miles NNE of Taconite Harbor, and **Leveaux Mountain,** 8 miles NE of the harbor, are two of the tallest peaks. **Rock Island,** a low rocky projection in the E approach to **Good Harbor Bay,** 3.6 miles SW of Grand Marais, is the only off-lying obstruction in this reach. Otherwise, the shore can be approached within 0.5 mile.

(419) The settlements of **Schroeder, Tofte,** and **Lutsen** are close to shore in this reach, 1.3, 5, and 14.5 miles NE of Taconite Harbor, respectively. Landings at these places may be made by light-draft vessels in calm weather, but no shelter or dockage is provided. Tofte has a launching ramp. None of the streams that empty into this reach are navigable. **Temperance River** and **Cascade River,** 2.5 and 22 miles NE of Taconite Harbor, respectively, are the largest.

(420) **Grand Marais Harbor** is a small-craft harbor 31 miles NE of Taconite Harbor and 106 miles NE of Duluth. It is the only harbor with facilities and adequate protection for small craft in the 125 mile stretch between Two Harbors and the International boundary at Pigeon River. The harbor is a semicircular bay with a narrow opening to S between two points of land. The harbor is a commercial fishing base. **Grand Marais, Minn.,** is a town on the N side of the harbor.

(421) **Grand Marais Light** (47°44.7′N., 90°20.3′W.), 48 feet above the water, is shown from a white square pyramidal skeleton tower, upper part enclosed, on the E side of the harbor entrance. A fog signal is at the light.

(422) **Channels.**–The dredged harbor basin is entered N from Lake Superior between breakwaters that extend from the E and W sides of the entrance. An inner breakwater protects a dredged small-craft basin in the N part of the harbor. The outer ends of the entrance breakwaters and the inner breakwater are marked by lights. In October 1996, the controlling depths were 16 feet in the main harbor basin with shoaling to 13 feet in the N section, thence 5 to 8 feet in the small-craft basin with lesser depths along the S edge.

(423) **Anchorage.**–The E part of the harbor is fairly well protected from all storms, and fair anchorage is available in the E part of the dredged area for a few vessels. The W part of the harbor is shoal, exposed to SE storms, and considerably exposed to NE swells.

(424) **Caution.**–Vessels entering the harbor during NE storms should keep well over to the E breakwater to avoid the shoals to W.

(425) **Local magnetic disturbance.**–Large magnetic disturbances have been reported in the vicinity of Grand Marais Harbor.

(426) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(427) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(428) **North Superior Coast Guard Station** is on the SE side of the harbor basin.

(429) **Small-craft facilities.**–Two wharves in the SE corner of the harbor basin, one partly in ruins, are not safe for mooring. A marina in the basin at the N end of the harbor provides gasoline, diesel fuel, water, electricity, sewage pump-out, and limited supplies and repairs. Small craft can find safe moorings in the basin. Mooring to the breakwaters is prohibited.

(430) At the SE end of the point that encloses the E side of Grand Marais Harbor, a reef with a depth of 8 feet at the outer end extends 1,000 feet E from shore.

(431) From Grand Marais Harbor NE for 34 miles to Grand Portage Bay, the shore is rocky and bold, with deep water close-to and a few outlying rocks. **Five Mile Rock,** awash, is 0.8 mile offshore 5 miles NE of Grand Marais Light. **Marr Island,** low and rocky, is on the outer end of a reef that extends 0.4 mile from a small point 12.5 miles NE of Grand Marais. A detached rock, covered 5 feet, is 0.4 mile offshore 0.7 mile SW of the S entrance point to Grand Portage Bay. **Chicago Bay** and **Big Bay,** 18 and 21 miles NE of Grand Marais, respectively, are the largest indentations in this stretch and afford limited protection. **Hovland,** a settlement on Chicago Bay, has a small privately owned dock.

(432) **Caution.**–This stretch of shore should be given a berth of 1 mile because of frequent fogs and local magnetic disturbances.

(433) **Charts 14967, 14968.–Grand Portage Bay,** about 5 miles SW of the International boundary, is about 2 miles wide and extends 1.3 miles into the shoreline. **Hat Point** (47°57.2′N., 89°38.3′W.), marked by a light, encloses the NE side of the bay and separates it from Wauswaugoning Bay. **Grand Portage Island,** in the middle of the entrance to the bay, affords some protection from offshore winds. Inside Grand Portage Island, the bay has depths of 6 to 12 feet. Boats drawing 8 feet or more should not approach nearer than 0.25 mile to shore. A 6-foot shoal midway between Grand Portage Island and Hat Point renders the bay entrance NE of the island hazardous.

(434) **Small-craft facilities.**–Marinas on the N and W sides of the bay provide berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and launching ramps. A small store is near the ferry dock on the NW side of the bay. Small passenger ferries run from this dock to several harbors on Isle Royale.

(435) **Ferries.**–A ferry service operates between Grand Portage and Isle Royale National Park in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich. 49931.

(436) **Wauswaugoning Bay** is just NE of Grand Portage Bay, separated from it by Hat Point. The shore of the bay along Hat Point is a continuous rocky cliff rising to about 100 feet above the lake. **Mount Josephine,** at the inner end of Hat Point, rises 700 feet above the lake. The NW side of the bay is bordered by a 500-foot bluff with a boulder beach broken by cliffs. The NE side of the bay is low and heavily wooded.

(437) A rocky reef, covered 5 feet, is about 0.6 mile offshore on the NW side of Wauswaugoning Bay. **Francis Island,** small and rocky, is on a rocky ledge that extends 0.4 mile W from the E point of the bay. Aside from these hazards and the shallows at the NE end of the bay, there are good depths and the shores are fairly deep-to. The bay has good holding ground for anchorage, but is exposed to SE to SW winds.

(438) Wauswaugoning Bay is partially protected by a group of small islands that extend 2 miles SE from the E point of the bay. **Lucille Island,** the outermost, **Susie Island,** and **Magnet Island** are the largest in the group. A dangerous detached rock is 0.3 mile

SE of the SW point of Lucille Island. Caution is advised when navigating around and between these islands.

(439) From Wauswaugoning Bay, the shore trends ENE for 5.5 miles to Pigeon Point (48°00.2'N., 89°29.8'W.). **Clark Bay,** at the inner end of Pigeon Point, is a small inlet open to E and protected on the S side by a point and two small islands. **Pigeon Point** is a rocky peninsula that extends 3.5 miles ENE and encloses the S side of **Pigeon Bay.** The bay, about 3.5 miles long and 1 mile wide, is bordered by high hills and bluffs which protect it from all directions but E. **Pigeon River** flows into the W end of the bay at the base of Pigeon Point.

(440) **Local magnetic disturbance.**–Large magnetic disturbances have been reported near Pigeon Point.

(441) The **International boundary** between the United States and Canada extends through Pigeon Bay and then follows the Pigeon River.

(442) **Time.**–Lakeshore areas of the Canadian Province of Ontario observe eastern standard time or eastern daylight saving time. Areas S of the Pigeon River on the W shore of Lake Superior observe central standard time or central daylight saving time.

(443) **Boundary Island** is a dangerous reef with several small islets near the center of Pigeon Bay. Close NW of Boundary Island, a narrow point extends 1 mile E from shore to divide the inner part of the bay into two arms. A reef with small islets extends off the end of the point. **Acadia Rock,** covered 4 feet, is 1 mile WSW of Boundary Island. **Laura Grace Rock,** covered 6 feet, is 0.3 mile W of Acadia Rock. Other than these dangers, the bay has deep water. Caution is advised when anchoring, because the rocks limit the available room and the holding ground is not good.

(444) **Charts 14968, 14976.–Isle Royale** is 44 miles long NE and SW and has a maximum width near its SW end of 8.5 miles. **Mount Desor,** 794 feet above the lake and the highest point on the island, is 12.5 miles from the SW end. The shores of the island have numerous indentations and many detached islets and reefs, almost all with a NE and SW trend. Good lees can be found in many bays and channels.

(445) **Local magnetic disturbance.**–Magnetic disturbances have been observed around Isle Royale.

(446) Isle Royale and its surrounding islands form **Isle Royale National Park,** established in 1940 under the jurisdiction of the National Park Service, U.S. Department of the Interior. The park is retained as much as possible in its natural state. There are no roads, only trails for hikers.

(447) Recreational docks operated by concessions for the National Park Service at Rock Harbor, and at Windigo Ranger Station at Washington Harbor, offer groceries, gasoline, and water for the convenience of visitors. Small docks, generally in good repair and in sheltered areas, are maintained at the many campsites around the island. Most of them have from 5 to 10 feet at their outer ends. Lights are operated on the docks at Windigo, Rock Harbor, and the Park Service Headquarters dock on Mott Island on the SW side of Rock Harbor. Complete details regarding the island and its use are available from the Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich. 49931.

(448) **Caution.**–Designated aircraft landing areas are in Washington Harbor, Rock Harbor, and Tobin Harbor. (See **36 CFR 2.2 and 7.38,** chapter 2, for limits and regulations.)

(449) **Rock of Ages Light** (47°52.0'N., 89°18.8'W.), 130 feet above the water, is shown from a white conical tower on a small islet 3.8 miles W of **Cumberland Point,** the southwesternmost point of Isle Royale. A fog signal is at the light.

(450) A reef extends 0.4 mile SW and 0.1 mile NE from Rock of Ages. **Fisherman Reef,** 5.5 miles SW of Rock of Ages Light, has a least depth of 23 feet. Five shoal spots with depths of 7 to 16 feet are from 0.7 to 1.4 miles NE of the light. Several shoals with depths of 3 to 14 feet are within 1.2 miles S and SW of the light. The southernmost spot, covered 12 feet, is marked on the W side by a buoy. An 11-foot spot is 0.3 mile SE of the light.

(451) **Grace Harbor** and **Washington Harbor,** at the SW end of Isle Royale, have good holding ground and provide protection from all winds except SW winds in Grace Harbor. Grace Harbor is enclosed on the S by **Cumberland Point** and on the N by a line of islands, of which **Washington Island** is the largest and **Grace Island** the easternmost. The islands separate Grace Harbor from the outer part of Washington Harbor. A rock, covered 2 feet and marked by a buoy, is on the outer edge of the shoals off Cumberland Point. Several shoals and small islands extend W from Washington Island. The outermost are a 2-foot spot 0.7 mile SW and an 18-foot spot 1.1 miles WSW. A narrow 20-foot channel marked by buoys leads between the E end of Washington Island and **Booth Island** N to Washington Harbor. The N side of the outer part of Washington Harbor is enclosed by **Johns Island** and **Thompson Island.** Shoal spots of 3 to 11 feet extend 0.5 mile SW from Johns Island, the westernmost, and a detached 13-foot shoal is 0.2 mile SE of the island. The entrance to Washington Harbor is 0.3 mile wide between Washington Island and the shoals SW of Johns Island. A narrow deep channel leads between Thompson Island and Isle Royale into the harbor. A private daybeacon marks the NE side of Thompson Island, and a private buoy marks a sunken wreck on the E side of the channel. A small islet and a 3-foot shoal are 0.2 mile N of Grace Island.

(452) The inner part of Washington Harbor extends 3.3 miles into the shoreline of Isle Royale. **Beaver Island** is near the E end of the harbor and may be passed by small craft on either side. A rock awash is off the N shore of the harbor, 0.25 mile W of the SW end of Beaver Island. A wharf is at Windigo Ranger Station at the head of the harbor. Gasoline, diesel fuel, water, and sewage pumpout facilities are available. A small store is nearby.

(453) **Ferries.**–A ferry service operates between Grand Portage and Windigo in Washington Harbor in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich. 49931.

(454) From Washington Harbor, the shore of Isle Royale trends N for 1.2 miles to the NW corner of the island. A small island and a detached 7-foot shoal are 0.25 mile offshore about 0.6 mile N of Thompson Island.

(455) **McGinty Cove** is a small indentation 1 mile NE of the NW corner of the island. From the cove NE for about 19 miles to Todd Harbor, the shore is bold, clear, and deep-to except for several small detached shoals. **Finlander Reef,** comprising 6-foot and 7-foot spots, is 0.25 mile from shore 6.3 miles NE of McGinty Cove. A 3-foot spot is close to shore 5.3 miles NE of Finlander Reef. **Gull Rocks,** marked by a private marker, are 0.5 mile from shore about 6 miles SW of Todd Harbor. A 3-foot and a 14-foot spot are close inshore adjacent to Gull Rocks.

(456) **Todd Harbor,** about midlength of the N shore of the island, is about 5 miles long and indents the shore 0.75 mile. The harbor affords good protection from all but N winds. Care must be taken to avoid the many detached shoals and rocks in the harbor.

(457) From Todd Harbor to McCargoe Cove, the shore should be given a berth of 1 mile. **Hawk Island** parallels the shore in this stretch. An islet and rocks awash are 0.8 mile SW of Hawk Island. A 3-foot shoal is 0.15 mile N and rocks awash are 0.75 mile NNE of the island.

(458) **McCargoe Cove,** about 4.5 miles NE of Todd Harbor, is a narrow inlet that extends over 2 miles SSW into the shore of Isle Royale. A rocky ledge extends NE from the W side of the entrance and is marked at the outer end by a private buoy. The cove is entered between this and another private buoy close NNW. Coming around the ledge, vessels must turn through 090° on a radius of about 200 feet to keep in depths of 18 feet or more. The channel into the cove has a least depth of 15 feet, but inside depths are 30 to 40 feet. Small docks are on **Birch Island** on the E side of the cove entrance and near the head of the cove.

(459) The NE end of Isle Royale, quite rugged and broken, consists of many peninsulas, islands, and ridges separated by narrow channels and bays of deep water, all with a NE trend. The area is obstructed by numerous shoals and reefs which render navigation dangerous. **Amygdaloid Island, Canoe Rocks,** and the line of islands and reefs between them form the N limit of this area from McCargoe Cove NE for 10 miles. Amygdaloid Ranger Station is on the SW end of Amygdaloid Island. **Amygdaloid Channel** parallels the S side of Amygdaloid Island and is separated from **Robinson Bay** by a narrow peninsula, **Belle Isle, Green Island,** and a series of small islands and reefs. A small-craft dock is on the S side near the E end of Belle Isle. **Hill Point,** the SE entrance point to Robinson Bay, separates it from **Five Finger Bay.** A peninsula that terminates in **Locke Point** separates the S side of Five Finger Bay from Duncan Bay. A reef that extends 0.3 mile NE from Locke Point is marked at the outer end by a buoy.

(460) **Duncan Bay,** entered at the NE end of Isle Royale between Locke Point and Blake Point, extends about 4.5 miles SW. A point about 1 mile above the entrance divides the bay. The main body of the bay leads S of the point, through a narrow passage to a large bay. A rock awash is in midchannel of the narrowest part of the passage S of the point. The channel, S of the rock, has depths less than 12 feet. A 17-foot shoal is near midchannel S of the point that divides the bay. A small dock is on the S side of the narrow passage.

(461) **Blake Point,** the northeasternmost point of Isle Royale, forms the S entrance point to Duncan Bay. **Blake Point Light** (48°11.5′N., 88°25.3′W.), 40 feet above the water, is shown from a skeleton tower with a small house and a red and white diamond-shaped daymark on the point. An 11-foot shoal is 0.3 mile E of the light. **Five Foot Reef,** 0.9 mile E of the light, has a least depth of 4 feet and is marked on the S side by a buoy. A 13-foot shoal is 1.2 miles E of the light.

(462) **Passage Island Light** (48°13.4′N., 88°22.0′W.), 78 feet above the water, is shown from a gray octagonal tower on a dwelling on the SW end of **Passage Island, MI,** 3.5 statute miles (3 nm) NE of Blake Point. A fog signal, a radiobeacon, and a racon are at the light.

(463) **Gull Islands** are 3.5 miles NE of Passage Island. A shoal covered 2 feet is 0.5 mile S of the islands, and a group of detached rocky spots, covered 7 to 12 feet, is 0.7 to 2.5 miles NW of the islands.

(464) **Tobin Harbor** parallels Duncan Bay on the S side of Blake Point. **Scoville Point** is on the NE end of the peninsula that encloses the S side of the harbor. The harbor has good holding ground with protection from all winds, but is available only to small craft because of the narrow entrance. A dock is on the N side of the harbor about 1.1 miles SW of Scoville Point.

(465) **Rock Harbor,** S of Tobin Harbor, is about 13 miles long NE and SW. The outer 9.5 miles of the harbor is enclosed on the S side by a chain of islands and shoals. The harbor has good holding ground with protection from all winds. The fully enclosed W 3.5 miles of the harbor is obstructed near its midlength by shoals through which an 11-foot channel is marked by buoys.

(466) Rock Harbor can be entered at the NE end between **North Government Island** and **South Government Island.** Another wide, deep passage enters the harbor from S opposite Scoville Point. **Middle Islands Passage** enters the harbor from S at the inner end of the island chain. The channel has an available depth of 26 feet and is marked by a lighted bell buoy and two unlighted buoys. **Caribou Island** is on the E side of the passage.

(467) **Rock Harbor Lodge** is in a bight on the N side of Rock Harbor, 2 miles SW of Scoville Point. A 12-foot spot off the E entrance point to the bight is marked by a buoy. A wharf marked by a private light on the N side of the bight provides gasoline, diesel fuel, water, sewage pump-out, and electricity. Transient berths are available at several piers in the bight.

(468) The National Park Headquarters is in a bight on the NW side of **Mott Island,** 1.6 miles NE of Middle Islands Passage. The wharf at the headquarters has depths of 20 feet at the outer end, decreasing to 13 feet at its midlength, and with the inner end available for small boats. Gasoline, sewage pump-out facilities, and a hoist that can handle 60-foot craft for emergency repairs are available.

(469) **Ferries.**–A ferry service operates between Copper Harbor on the Keweenaw Peninsula and Rock Harbor in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich. 49931

(470) From Middle Islands Passage, the shore of Isle Royale extends S for 2 miles and thence SW for 23 miles to the head of Siskiwit Bay. This bay parallels the shore in the SW 12 miles of this reach and is enclosed on the S by a chain of islands and reefs. From Middle Islands Passage to Chippewa Harbor, shoals extend no more than 0.2 mile from shore.

(471) **Conglomerate Bay,** 0.8 mile S of Middle Islands Passage, has deep water and good protection from all but E winds.

(472) **Chippewa Harbor,** 5.4 miles SW of Middle Islands Passage, extends 2 miles W and SW into the shoreline of Isle Royale. The harbor is divided into deepwater areas by two narrows. Depths are about 14 feet through the first narrows and about 10 feet through the second. A dock is on the N side of the harbor just inside the first narrows.

(473) From Chippewa Harbor, the shore is free of outlying obstructions for about 6 miles to **Schooner Island** where shoals and submerged rocks extend 0.4 mile from shore.

(474) **Malone Bay,** just W of Schooner Island, is an indentation 3.5 miles wide, open to S except for protection behind **Hat Island, Ross Island, Malone Island,** and **Wright Island.** Shoals around these and other small islands, as well as numerous detached shoals, render navigation of Malone Bay hazardous.

(475) A channel with a depth of about 18 feet extends into Malone Bay between Malone Island and Wright Island. The channel is marked by buoys that mark dangerous shoals on either side of the channel. The bay has protection from all winds in depths of 36 to 48 feet, mud and clay bottom. Malone Bay Ranger Station is on the NE side of the bay.

(476) **Hopkins Harbor** is a sheltered inlet in the W side of Wright Island. A wharf on the S side of the inlet has depths of 15 feet alongside. Caution is advised when entering the inlet, because submerged boulders extend from the N side of the entrance.

(477) **Siskiwit Bay,** 12 miles long and 1.5 to 3 miles wide, is the largest indentation on the island. The bay has protection from all but NE to E winds. Good holding ground is 1.5 miles S of Wright Island. A dock on the S side near the head of the bay has a depth of 6 feet at the outer end. The bay is enclosed on the S side by a pen-

insula that terminates in **Point Houghton** (47°54.1′N., 88°54.0′W.) and by a double line of islets and reefs that extends 8 miles NE from the point, parallel to the S shore of Isle Royale. The only channel through the chain is 0.5 mile E of Point Houghton. The channel, marked by a lighted bell buoy and other buoys, has a depth of about 17 feet. **Harlem Reef,** with a least depth of 2 feet, is on the S side of the islet chain, 2.8 miles E of Point Houghton. A buoy marks the S side of the reef.

(478) **Isle Royale Light** (47°56.9′N., 88°45.7′W.), 72 feet above the water, is shown from a white octagonal tower with an attached dwelling on **Menagerie Island,** near the outer end of the islet chain on the S side of Siskiwit Bay. **Glenlyon Shoal,** with a least depth of 4 feet, is 0.7 mile NE of the light, and an 18-foot spot is 1.3 miles NE of the light.

(479) From Point Houghton, the shore of Isle Royale extends about 13 miles SW to **The Head,** the southernmost point of the island. Numerous ledges and rocky spots obstruct this stretch, and it should be given a berth of at least 1 mile. **Fishermans Home,** a small cove 0.9 mile SW of Point Houghton, has a commercial fishing operation with two docks. A narrow channel with a depth of 5 feet leads along the N side of the entrance into the cove. The entrance is deceptive and must be navigated with caution.

(480) From The Head, the shore extends NW for 4 miles to Cumberland Point on the S side of Grace Harbor.

(481) **Canadian Waters.**–The **International Boundary** between the United States and Canada extends through Pigeon Bay and then follows the Pigeon River upstream. The N shore of Lake Superior from the **International Boundary** in Pigeon Bay E to the head of the St. Marys River is in Canadian waters. For a description of this area consult **Canadian Sailing Directions-Great Lakes, Volume II**.

# 14. HUDSON RIVER, NEW YORK CANALS, AND LAKE CHAMPLAIN

(1) The **Hudson River** extends N from The Battery at New York City for about 152 miles to the head of tidal navigation at the Troy Lock and Dam at Troy, N.Y. (This section of the Hudson River is described in United States Coast Pilot 2, Cape Cod to Sandy Hook.)

(2) A Federal project provides for a 32-foot channel from New York City to Albany, thence a 14-foot channel to the Troy Lock and Dam. (See Notices to Mariners and latest editions of charts for controlling depths.)

(3) **Chart Datum, Hudson River**–The plane of reference for depths shown on charts of the Hudson River is mean low water as far N as the upper end of Haverstraw Bay, about 38 miles above The Battery. From Haverstraw Bay to the Troy Lock and Dam, the reference plane is Hudson River Datum, which is mean low water during lowest river stages.

(4) **Charts 12348, 14786.–Troy Lock and Dam** at **Troy, N.Y.**, 154 miles above The Battery at New York City, is the lower entrance to the New York State Canal System. The lock has a length of 492.5 feet and width of 44.4 feet, with a depth of 13 feet over the lower sill at lowest low water. The lift of the lock at lowest stages is 17.3 feet.

(5) **Regulations.**–(See **33 CFR 207.50,** chapter 2, for lock regulations and signals.)

(6) **Chart 14786.**–Above Troy Lock, the Hudson River extends N for about 2.3 miles to the junction of Erie Canal and Champlain Canal at **Waterford, N.Y.**

(7) The **New York State Canal System**, built and maintained by the State of New York, is a waterway providing access from the Hudson River to Lake Champlain on the E and to Lake Ontario and Lake Erie on the W. The system, comprising Champlain Canal, Erie Canal, Oswego Canal, and Cayuga and Seneca Canal, is 524 miles long, of which 370 miles are canalized rivers, streams, and lakes, and 154 miles are artificial land cuts. Detailed data regarding movement through the New York State Canal System may be obtained from the New York State Canal Corporation, Office of Canals, 200 Southern Boulevard, P.O. Box 189, Albany, NY 12201-0189, telephone (518-471-5011).

(8) A toll free telephone number (1-800-4CANAL4) to receive prerecorded messages and for publicizing events and attractions along the canal system is available to mariners within the state of New York.

(9) **Chart Datum, New York State Canal.**–The plane of reference for depths shown on charts of the New York State Canal System is normal pool level.

(10) **Champlain Canal,** 60 miles long, follows the canalized Hudson River from Waterford N to **Fort Edward, N.Y.,** thence follows a land cut and canalized **Wood Creek** to Lake Champlain. From Waterford, 8 locks ascend 124.8 feet to the summit elevation of 140 feet about 1.3 miles NE of Fort Edward, thence 3 locks descend 43.5 feet to **Whitehall, N.Y.,** at the S end of Lake Champlain.

(11) **Charts 14786, 14788.–The Erie Canal** is 338 miles long from Waterford W across New York State to Tonawanda on the Niagara River. From Waterford, the canal follows the canalized **Mohawk River,** a short reach of **Wood Creek,** and several interspersed land cuts to **Oneida Lake.** After passing through the lake, the canal follows **Oneida River, Seneca River, Clyde River,** and several land cuts to **Lyons, N.Y.** A 6.8-mile-long branch channel extends SE from the Seneca River through **Onondaga Lake** to **Syracuse, N.Y.** W of Lyons, the canal is an artificial channel to **Pendleton, N.Y.,** thence the canal follows Tonawanda Creek to Tonawanda. About 39 miles W of Lyons, the canal crosses the **Genesee River.** From the intersection, a 3.2-mile section of the Genesee River has been improved to provide access from the canal to Rochester. A dam on the Genesee River 7 miles downstream of the canal precludes navigable access to Lake Ontario.

(12) The Erie Canal, from Waterford to Tonawanda, has 34 locks. At Waterford, a flight of 5 locks ascends 168.8 feet from the pool above Troy Lock and Dam around Cohoes Falls to the Mohawk River, thence 14 locks ascend the Mohawk Valley 236 feet to the summit level near Rome, N.Y., thence 3 locks descend 57 feet to Three Rivers, N.Y., at the junction with Oswego Canal, and thence 12 locks ascend 201 feet to the Niagara River.

(13) **Chart 14786.–Oswego Canal** branches NW from Erie Canal about 160 miles W of Waterford at **Three Rivers, N.Y.,** at the confluence of Oneida River, Seneca River, and Oswego River. The canal, 24 miles long, is formed almost entirely by the canalized **Oswego River.** The canal descends 118 feet through 7 locks from Three Rivers to Lake Ontario. (Oswego Harbor is described in chapter 5.)

(14) **Charts 14786, 14791.–Cayuga and Seneca Canal** branches S from the Erie Canal about 41 miles W of Three Rivers. The canal follows the canalized Seneca River and leads S through both **Cayuga Lake** and **Seneca Lake.** The canal is 92 miles long to **Ithaca, N.Y.,** at the S end of Cayuga Lake and to **Watkins Glen, N.Y.,** at the S end of Seneca Lake including a 2.5-mile cut to **Montour Falls, N.Y.,** S of Watkins Glen. From the Erie Canal, 1 lock ascends 7.5 feet to Cayuga Lake, and thence 3 locks ascend 64.5 feet to Seneca Lake.

(15) **Caution.**–Four private special purpose lighted mooring buoys, painted red and white, mark a barge moored about 2.9 miles N of **Long Point** (42°39.4′N., 76°54.6′W.) on Seneca Lake. Three private special purpose lighted mooring buoys, painted red and white, mark a barge moored about 1 mile NE of Long Point.

(16) Another facility of barge and buoys is 0.25 mile SW of **Portland Point** near the S end of Cayuga Lake. The barge and two mooring cables are each marked by a white buoy floodlighted at night. The barge is marked by four vertical lights, one showing fixed white and three showing fixed red.

(17) **New York State Canal, Chart Coverage.**–The National Ocean Service provides chart coverage of the New York State Canal System from the Hudson River at Troy, NY, as far W as Lyons, NY. Coverage of the canal system from Syracuse W to the Niagara River at Tonawanda, NY, is contained in New York State Canal Guide, available from Mid-Lakes Navigation Company, Ltd., Box 61, Skaneateles, NY 13152, 1(800)545-4318; 315-685-8500.

(18) **Channels.**–The **Great Lakes-Hudson River Waterway Improvement** is that part of the barge canal system including the

## Structures across the Hudson River
### *Miles above The Battery, New York City
### **Clear width in feet proceeding upstream

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Low | High | |
| 1 | George Washington Bridge (I-95; US 1/9) | Highway | 11.0 | | | 3,169 | | 195 | Suspension. Note 1. |
| 2 | Tappan Zee Bridge (I-87/287) | Highway | 27.0 | 499 | 500 | 1,098 | | 139 | Fixed. |
| 3 | Overhead cables | Power | 41.8 | | | | | 160 | |
| 4 | Peekskill: Bear Mountain Bridge (SR 6) | Highway | 46.7 | | | 1,584 | | 155 | Fixed. |
| 5 | Newburgh:Beacon Bridge (I-84) | Highway | 62.0 | 550 | 550 | 760 | | 148 | Fixed. Under construction 1979. |
| 6 | Newburgh:Beacon Bridge (I-84) | Highway | 62.0 | 550 | 550 | 960 | | 150 | Fixed. Note 2. |
| 7 | Poughkeepsie: Mid-Hudson Bridge (US 44) | Highway | 75.6 | 520 | 450 | 1,458 | | 137 | Suspension. Note 3. |
| 8 | Poughkeepsie: ConRail Bridge | Railroad | 76.1 | | | 490 | | 167 | Fixed. |
| 9 | Kingston: Rhinecliff Bridge (SR 199) | Highway | 94.3 | 760 | 760 | | | 135 | Fixed. |
| 10 | Catskill: Rip Van Winkle Bridge (SR 23) | Highway | 113.6 | | | 480 | | 142 | Fixed. |
| 11 | Overhead cables | Power | 116.2 | | | | | 145 | |
| 12 | Overhead cable | Power | 135.5 | | | | | 185 | |
| 13 | Castleton: ConRail Bridge | Railroad | 135.6 | 75 | 566 | 371 | | 139 | Fixed. Clearance is for left span. |
| 15 | Castleton:Castleton-on-Hudson Bridge (I-90 E-W; NY State Thruway) | Highway | 135.7 | | | 552 | | 135 | Fixed. |
| 16 | Overhead cable | Power | 141.9 | | | | | 169 | |
| 17 | Overhead cable | Power | 142.1 | | | | | 194 | |
| 18 | Dunn Memorial Bridge US 9/20) | Highway | 145.4 | | | 300 | | 60 | Fixed. |
| 19 | Albany: ConRail/Amtrak Bridge | Railroad | 146.2 | 103 | 98 | | | 25 | Swing. Note 4. |
| 20 | Overhead cable | Power | 146.2 | | | | | 135 | |
| 21 | Overhead cable | Power | 146.8 | | | | | 88 | |
| 22 | Albany: Patroon Island Bridge (I-90) | Highway | 147.2 | | | 300 | | 60 | Fixed. |
| 23 | Overhead cable | Power | 148.5 | | | | | 95 | |
| 24 | Overhead cable | Power | 149.7 | | | | | 87 | |
| 25 | Troy/Menands: Menands Bridge (SR 378) | Highway | 150.2 | | | 317 | | 61 | Note 5. |
| 27 | Troy: Congress St. Bridge (SR 2) | Highway | 152.1 | | | 250 | | 55 | Fixed. |
| 28 | Troy: Green Island Bridge (SR 7) | Highway & Railroad | 152.7 | | | 167 | | 24 | Vertical lift. Being removed 1978. |
| 29 | Troy: Green Island Bridge (SR 7) | Highway | 152.7 | | | 184 | | 29 | Vertical lift. Under construction 1979. Notes 4 and 7. |
| 30 | Troy/Green Island: Collar City Bridge | Highway | 153.1 | 145 | 200 | | | 60 | Fixed. Under construction 1978. |
| | Troy Lock | | 153.9 | | | | | | |
| 31 | Troy/Cohoes: 112th Street Bridge (SR 470) | Highway | 155.4 | | | 175 | 33 | | Bascule. Notes 4 and 6. |

Note 1.–The bridge has a center clearance of 213 feet, with a clearance of 210 feet at the W end of the span and 195 feet at the E end of the span.
Note 2.–The bridge has a center clearance of 181 feet, with a clearance of 150 feet for a center width of 760 feet.
Note 3.–Clearance is for 750-foot center width.
Note 4.–See **33 CFR 117.1 through 117.59 and 117.791,** chapter 2, for drawbridge regulations.
Note 5.–Vertical lift span maintained in the closed position. See **33 CFR 117.791,** chapter 2, for drawbridge regulations.
Note 6.–Clearance is above maximum navigable pool level.
Note 7.–The design clearance in the up position is 60 feet.

Erie Canal from Waterford W to Three Rivers and thence the Oswego Canal to Lake Ontario. This section of the system, funded by the U.S. Government and maintained by the State of New York, has a project depth of 14 feet at normal pool level between locks and 13 feet at normal pool level through all locks and guard gates. These channels have widths of 104 feet in earth cuts, 120 feet in rock cuts, and 200 feet in river and lake sections.

(19) Elsewhere in the New York State Canal System, the project depth is 12 feet in all channels and through all locks and guard gates. These channels have widths of 75 feet in earth cuts, 94 feet in rock cuts, and generally 200 feet in canalized rivers.

(20) The barge canal system is well marked by lights, lighted ranges, lighted and unlighted buoys, and daybeacons, all maintained by the State of New York. The arrangement of aids considers the entire canal system as a waterway extending from the Hudson River to interior parts of the State. All red lights, daybeacons, and buoys are on the right or starboard hand, and all white lights, daybeacons, and buoys are on the left or port hand when proceeding up or away from the Hudson River, or away from the main line in the branches. This arrangement extends W to Tonawanda on the Niagara River. However, buoyage in the Niagara River is based on the principle that "proceeding from seaward" is proceeding from Lake Erie toward the Niagara Falls. Mariners are therefore reminded, after exit from the barge canal into the Niagara River, to keep red buoys to port and green buoys to starboard when continuing on to Lake Erie.

(21) **Locks.**–The New York State Canal System has a total of 56 locks plus the Federal lock at Troy. The controlling dimensions of the locks are a length of 300 feet and a width of 43.5 feet. The locks and guard gates have a depth of 12 feet over the sills at normal pool level, except 13 feet over the sills in the Great Lakes-Hudson River Waterway Improvement. The lock lifts range from 6 feet to 40.5 feet, with an average lift of 17.7 feet. The guard gates at various points in the canal system have a pier in midchannel with a clear passage of 55 feet on either side.

(22) **Bridges.**–The barge canal system is crossed by a total of over 300 bridges. Most of the bridges are fixed, except where local conditions necessitate other types. The least vertical clearance for bridges crossing the part of the system known as the Great Lakes-Hudson River Waterway Improvement is 20 feet, and the least clearance for all other parts of the canal system is 15 feet.

(23) **Regulations.**–A **speed limit** of 6 mph is enforced in the barge canal, except in the canalized rivers and lakes. In the canalized rivers and lakes, the speed limit is dependent on traffic conditions, and speed limits for the various sections are posted at each lock. Copies of the canal regulations and detailed information regarding movement through the canal are available from the New York State Canal Corporation, Office of Canals, 200 Southern Boulevard, P.O. Box 189, Albany, NY 12201-0189, telephone (518-471-5011).

(24) **Small-craft facilities.**–Marinas providing all types of small craft services and supplies are located throughout the barge canal system. A list of sewage pump-out facilities in New York State is available from the New York State Department of Environmental Conservation, 50 Wolf Road, Albany, N.Y. 12205.

(25) **Charts 14784, 14783, 14782, 14781.–Lake Champlain** extends from the lower end of Champlain Canal at Whitehall, N.Y., N for about 112 miles to the International boundary at Rouses Point, N.Y. The N end of the lake outlets N through Riviere Richelieu and Canal de Chambly to the St. Lawrence River.

(26) The principal ports on the lake are Port Henry, N.Y., at the S end, Burlington, Vt., and Plattsburgh, N.Y., near midlake, and Rouses Point, N.Y., at the N end. The lake is used extensively by pleasure craft, and marinas are found on both sides throughout its length.

(27) **Chart Datum, Lake Champlain.**–The plane of reference for depths shown on the charts covering Lake Champlain is low lake level, which is 93.0 feet above mean sea level.

(28) A **special anchorage** is on the W side of the lake in **Deep Bay.** (See **33 CFR 110.1 and 110.8(i),** chapter 2, for limits and regulations.)

(29) **Channels.**–The S 37 miles of Lake Champlain, from Whitehall N to **Crown Point** (44°01.8′N., 73°25.8′W.), is a narrow arm. The S 13 miles of this arm, from Whitehall N to **Benson Landing,** is filled with a marshy flat traversed by a narrow channel of open water. A Federal project provides for a 12-foot channel through this reach. In 1979, the centerline controlling depth in the reach was 11 feet. Above Benson Landing, natural deep water is available to Crown Point. The entire narrows, from Whitehall to Crown Point is well marked by lights and buoys.

(30) N from Crown Point for about 75 miles to Rouses Point, Lake Champlain is deep and wide. Prominent points and shoals throughout the lake are marked by lights and buoys.

(31) **Fluctuations of water level.**–The water level of Lake Champlain is subject to variation from year to year; the observed range is from 0.6 foot below to 8.8 feet above the reference plane of low lake level. During each year, the seasonal fluctuation is 4 to 5 feet, the lowest stage occurring in September or October and the highest stage in April or May.

(32) Following is a description of the principal ports and tributaries of Lake Champlain.

(33) **Chart 14784.–Poultney River,** not navigable, flows into the E side of Lake Champlain about 1 mile N of Whitehall. The **State boundary** between New York and Vermont follows Lake Champlain from the mouth of Poultney River N to the International boundary.

(34) Marinas in the stretch from Whitehall to Port Henry are at **Chipman Point** 19 miles N of Whitehall, 1.5 miles N of Chipman Point, and at the mouth of **Hospital Creek** opposite Port Henry. The usual services and travelifts to 20 tons are available.

(35) **La Chute** is a creek that flows into the W side of the lake about 22 miles N of Whitehall. The approach to the creek is very shoal and weedy and is not recommended for other than small outboards, which can then navigate the creek for about 1 mile during high stages. **Fort Ticonderoga,** on the point E of the creek mouth, is prominent from the lake.

(36) **Cable ferry.**–Fort Ticonderoga Ferry crosses the lake about 1.7 miles above La Chute. The ferry barge is towed by a tug and guided across the lake by two cables which are fixed on either shore. Passing through guides and carrier wheels on the ferry, the cables are dropped to the bottom astern and picked up ahead. The cables reach the bottom about 400 feet from either end of the ferry thus allowing vessels to pass by the moving ferry. The tug and barge are marked by lights, and signs on both and along the shore warn vessels of the presence of the ferry and the cables. **Extreme caution is advised when passing the cable ferry. The ferry should never be passed closeby.**

(37) A **special anchorage** is on the W side of the lake just S of the ferry crossing. (See **33 CFR 110.1 and 110.8(a),** chapter 2, for limits and regulations.)

(38) **Port Henry, N.Y.,** is on the W side of Lake Champlain at the S end of the wide section, about 39 miles N of Whitehall.

## Structures across Lake Champlain
### *Miles from Whitehall
### **Clear width in feet proceeding away from Whitehall

| No. | Location and Name | Kind | Miles* | Clear width in feet of draw or span openings** | | | Clear height in feet above Water Datum | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Right | Left | Center | Low | High | |
| 1 | Overhead cable | Power | 0.3 | | | | | | Data not available. |
| 2 | Overhead cable | Power | 1.0 | | | | | | Data not available. |
| 3 | South Bay-Delaware & Hudson Ry. bridge | Railroad | 2.5 | 89 | 89 | 96 | 11 | | Fixed. |
| 4 | South Bay-Overhead cable | Power | 3.0 | | | | | | Data not available. |
| 5 | South Bay-State Route 22 bridge | Highway | 3.2 | | | | | | Fixed. Data not available. |
| 6 | Crown Point-Chimney Point bridge | Highway | 36.7 | | | 186 | 91 | | Fixed. Note 1. |
| 7 | Colchester Point-South Hero Island bridge | | 78.1 | | | 177 | | | Swing span and center pier removed. |
| 8 | Overhead cable | | 82.4 | | | | 45 | | |
| 9 | Sand Bar Bridge | Highway | 82.6 | | | 54 | 15 | | Fixed. |
| 10 | South Hero-North Hero Islands bridge | | 90.1 | | | 158 | | | Swing span and center pier removed. |
| 11 | South Hero-North Hero Islands (U.S. 2) bridge | Highway | 91.8 | | | 80 | 18 | | Bascule. Note 2. |
| 12 | Pelots Point-Alburg Tongue bridge | | 95.7 | | | 154 | | | Swing span and center pier removed |
| 13 | North Hero Island-Alburg Tongue (South Alburg) bridge | Highway | 99.2 | | | 70 | 25 | | Fixed. |
| 14 | Overhead cables | | 99.3 | | | | 47 | | |
| 15 | Isle La Motte-Alburg Tongue bridge | Highway | 99.4 | | | 30 | 8 | | Fixed. |
| 16 | Missisquoi Bay-Central Vermont Ry. bridge | Railroad | 105.6 | | | 36 | 11 | | Swing. Note 2. |
| 17 | Overhead cables | Power | 105.9 | | | | 50 | | |
| 18 | Missisquoi Bay-East Alburg (State Route 78) bridge | Highway | 105.9 | | | 45 | 18 | | Bascule. Note 2. |
| 19 | Rouses Point bridge | | 106.8 | | | 237 | 56 | | Fixed. Note 1. |

Note 1.–Bridge is across the direct route through the lake proceeding from the Hudson River to the St. Lawrence River.
Note 2.–See **33 CFR 117.1 through 117.59, 117.797, and 117.993,** chapter 2, for drawbridge regulations.

(39) **Channels.**–A dredged basin along the harbor front is entered from S. The E side of the entrance is marked by a buoy that marks the S end of the shoals that border the E side of the basin. At the N end of the harbor, a 500-foot pier of the New York State Canal System extends SE from shore and is marked at the outer end by a private light. The pier also serves as a breakwater to protect the harbor from N. A State-dredged channel leads from deep water W to the terminal. In 1967, the maximum depth available in the harbor basin and barge canal terminal channel was 12 feet.

(40) **Small-craft facilities.**–A 50-ton marine railway, which can handle 50-foot craft for hull and engine repairs, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, and mooring buoys are available at the marinas in Port Henry.

(41) **Bulwagga Bay,** S of Port Henry on the W side of Crown Point, is foul with submerged piles and cribs. A line of submerged piles that extends from the E side across the mouth of the bay is marked by private buoys.

(42) **Chart 14783.**–Between **Barber Point** (44°09.2′N., 73°24.3′W.) and **The Four Brothers** 20 miles N, marinas are on the W side of the lake at **Westport, N.Y.,** and **Essex, N.Y.,** and on the E side of the lake on the S side of **Thompsons Point** and in **McNeil Cove.** Marine railways to 50 tons, lifts to 35 tons, and the usual services are available.

(43) **Special anchorages** are on the E side of Thompsons Point and at Essex, N.Y. (See **33 CFR 110.1 and 110.8 (b) and (g),** chapter 2, for limits and regulations.)

(44) **Otter Creek** flows into the E side of the lake about 6.5 miles NE of Barber Point. A depth of about 6 feet can be carried by small craft for 8 miles to **Vergennes, Vt.**

(45) **Boquet (Bouquet) River,** 3 miles N of Essex, is navigable by small motorboats for about 1 mile during high water stages.

(46) **Charts 14783, 14782.–Willsboro Bay,** on the W side of the lake W of The Four Brothers, is enclosed on the E by **Willsboro Point.** Marinas on the E side of the bay provide transient berths, gasoline, diesel fuel, electricity, ice, sewage pump-out

mast-stepping service, launching ramps, and hull and engine repairs.

(47) **Shelburne Bay,** E of The Four Brothers, is enclosed on the W by **Shelburne Point.** Two special anchorages are on the W side of the bay. (See **33 CFR 110.1 and 110.8(c) and (c–1),** chapter 2, for limits and regulations.) A boatyard on the W side of the bay provides transient berths, gasoline, diesel fuel, water, ice, electricity, and sewage pump-out. A 220-foot marine railway and a 30-ton lift are available for hull and engine repairs.

(48) **Charts 14782, 14785.–Burlington, Vt.,** just N of the entrance to Shelburne Bay, is the largest port on Lake Champlain. Several companies have dock facilities for receipt of petroleum products by barge. The Radisson Hotel, with a red lighted sign, is the most prominent object in the harbor approach.

(49) **Burlington Breakwater North Light** (44°28.8′N., 73°13.8′W.), 35 feet above the water, is shown from a red skeleton tower adjoining a small white house on the N end of the N breakwater; a fog signal is at the light.

(50) **Channels.**–Two detached breakwaters parallel the shore and protect the harbor front from W. A light with a fog signal marks the N end of the N breakwater, a light marks the S end of the S breakwater, and a daybeacon marks the N side of the gap between them. Depths in the harbor are 6 to 12 feet off the wharves increasing to much greater depths at the breakwaters. Good anchorage is available behind the breakwaters.

(51) **Burlington Coast Guard Station** is at the N end of the harbor, E of Burlington Breakwater North Light.

(52) **Harbor regulations** are established by the Burlington City Council and are enforced by the **harbormaster** who may be reached at City Hall. A **speed limit** of 5 mph is enforced in the city yacht basin. Copies of the regulations may be obtained from the Mayor, City Hall, Burlington Vt. 05401.

(53) **Small-craft facilities.**–Marinas in the city yacht basin 0.6 mile SE of Burlington Breakwater North Light provide transient berths, gasoline, diesel fuel, water, ice, electricity, and a launching ramp.

(54) A **special anchorage area** for vessels less than 65 feet in length is about 0.2 mile NE of Burlington Breakwater South Light. (See **33 CFR 110.1 and 110.8(h)**, chapter 2, for limits and regulations.)

(55) **Ferry.**–Passenger and automobile ferries operate seasonally between Burlington and Port Kent, N.Y., 10 miles WNW.

(56) **Caution.**–An operations area for amphibious and air rescue training is in midlake W of Burlington, bounded generally by Schuyler Reef, Appletree Shoal, Juniper Island, and The Four Brothers. The using agency is Plattsburgh Air Force Base.

(57) **Chart 14782.**–From Willsboro Bay N to Plattsburgh, N.Y., marinas are at **Port Kent, N.Y.,** 4.5 miles N of Port Kent, and W of **Valcour Island.** The usual small-craft facilities are available.

(58) **Winooski River,** 4 miles NNW of Burlington, is navigable by small motorboats.

(59) **Malletts Bay,** 6 miles N of Burlington, is a nearly landlocked bay protected on the W by **Malletts Head.** About 3.5 miles W of Malletts Head, in the approach to the bay from the open lake, an abandoned railroad dike extends from the mainland shore N to the S end of Grand Isle near midlake. A narrow gap near the N end of the dike, marked on either side by a private light, provides access for small craft. A shifting bar at the gap has depths of as little as 3 feet. A 1-foot spot just inside the gap is marked by a buoy. **Special anchorages** are on the W side of Malletts Bay. (See **33 CFR 110.1 and 110.8(d) and (e),** chapter 2, for limits and regulations.) Marinas in Malletts Bay provide transient berths, gasoline, diesel fuel by truck, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Lifts to 20 tons are available for hull and engine repairs.

(60) **Plattsburgh, N.Y.,** is on the W side of **Cumberland Bay,** 20 miles NW of Burlington. Several companies receive petroleum products by barge at the town.

(61) **Channels.**–The dredged basin along the city waterfront is protected from the E by a detached breakwater paralleling the shore. The ends of the breakwater are marked by lights. The controlling depths are 5 to 9 feet at the wharves increasing to 12 feet at the breakwater. The protected area of the harbor provides good anchorage. A seasonally deployed floating breakwater is close S of the wharves on the W side of the basin.

(62) **Wharf.**–A terminal of the New York State Canal System is in the NW corner of Cumberland Bay. The wharf has a 400-foot S face with a reported depth of 12 feet alongside. The approach to the wharf is marked by a buoy and a private **322°** lighted range.

(63) **Small-craft facilities.**–A marina at Plattsburgh provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 20-ton lift is available for hull and engine repairs.

(64) **Ferry.**–A ferry operates from the E side of **Cumberland Head,** which encloses the E side of Cumberland Bay, to the W side of Grand Isle.

(65) **Charts 14782, 14781.–Grand Isle** or **South Hero Island, North Hero Island,** and **Alburg Tongue** divide the N part of Lake Champlain into two arms. **Missisquoi Bay** is at the N end of the E arm, and Riviere Richelieu flows N from the W arm.

(66) **Lamoille River,** 2.8 miles N of Mallets Bay, is navigable at low stages only by motorboats drawing 1 to 2 feet. The channel through the fixed span of the bridge that connects the S end of Grand Isle with the mainland had a reported controlling depth of less than 2 feet in 1977. **Missisquoi River,** flowing into the S side of Missisquoi Bay, is navigable at low stages by motorboats drawing 1 to 2 feet for about 6 miles to Swanton. **Dead Creek,** the alternate entrance to the river, has depths of 2 to 12 feet.

(67) Marinas are in the E arm of the N end of Lake Champlain on the SE side of Grand Isle, at the NE end of **Burton Island** on the W side of **St. Albans Bay,** in **City Bay** on the E side of North Hero Island, and on the E side of **Alburg Passage.** Lifts handling boats to 25 feet are available.

(68) A **special anchorage** is at the head of St. Albans Bay. (See **33 CFR 110.1 and 110.8(f),** chapter 2, for limits and regulations.)

(69) **Great Chazy River** flows into the W side of Lake Champlain about 4 miles S of Rouses Point, N.Y. The entrance to the river is marked by private lighted and unlighted buoys. The river is navigable at low stages by small boats drawing 2 to 3 feet for about 6 miles to Champlain. In 1979, the entrance channel had a controlling depth of 5 feet. In 1977, 5 feet was reported available to the marina 0.5 mile above the mouth.

(70) In September 1992, an obstruction was reported in the entrance channel between Buoy 8 and Buoy 10.

(71) Marinas are in **Mooney Bay** (44°47.2′N., 73°22.0′W.) opposite the S end of North Hero Island and 0.5 mile above the mouth of Great Chazy River. Lifts handling boats up to 25 feet are available.

(72) **Chart 14781.–Rouses Point, N.Y.,** is a town and harbor on the W side of the N end of Lake Champlain, just S of the International boundary. The harbor is formed by a bight that extends 2

miles N from **Stony Point.** A detached breakwater, marked at the outer end by a light, extends NE from Stony Point to protect the harbor from S, and a pile railroad trestle protects the harbor from NE.

(73) The harbor has depths of 6 to 8 feet in all seasons of the year, except for depths of 4 feet and less on a reef that extends 0.5 mile S from the point that encloses the N end of the harbor. Anchorage bottom in the harbor is good.

(74) Rouses Point is a **customs port of entry.**

(75) **Quarantine, customs, immigration, and agricultural quarantine.**–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

(76) **Quarantine** is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

(77) **Small-craft facilities.**–A protected basin is between the railroad trestle and a 500-foot pier just S. The outer 200 feet of the basin has depths of 6 to 8 feet, and the inner part is foul. Marinas at Rouses Point provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and some marine supplies. A 10-ton mobile lift is available for hull and engine repairs.

(78) **Canadian Waters.**–The **International boundary** between the United States and Canada is on a general E and W line about 2.7 statute miles (2.3 nm) N of **Stony Point** (44°58.5′N., 73°21.7′W.).

(79) **Charts 14781, *1351, *1350.–Riviere Richelieu** flows N from the head of Lake Champlain at Rouses Point fot about 80 statute miles (69.5 nm) to its mouth at the St. Lawrence River at the city of **Sorel, Que.,** about 46 statute miles (about 40 nm) below Montreal.

(80) **Restricting dimensions.**–The size of vessels passing through the system is limited by the dimensions of the locks of **Canal de Chambly** and by the bridge **Pont Felix-Gabriel-Marchand** across the Canal de Chambly in the vicinity of **Saint-Jean-sur-Richelieu**; length 33.98 m (111 feet), width 7 m (23 feet), depth over the sills 1.98 m (6.5 feet), least vertical clearance 8.8 m (29 feet). In periods of extreme low water levels the least draft will be less..

(81) See **Canadian Sailing Directions Saint Lawrence River-Cap Rouge to Montreal (ATL 112)** for detailed description of the system.

# APPENDIX

(1) **Sales Information.**–National Ocean Service (NOS) and unclassified National Imagery and Mapping Agency (NIMA) publications and nautical charts are sold by NOS and its authorized sales agents in many ports of the United States and in some foreign ports. Mail orders should be addressed to:

(2) National Ocean Service

(3) Distribution Division (N/ACC3)

(4) 6501 Lafayette Avenue

(5) Riverdale, MD 20737-1199.

(6) Telephone orders may be placed (Visa or Mastercard accepted) by calling 1-800-638-8972, or 301-436-6990. Mail orders must be accompanied by a check or money order (payable in U.S. funds) payable to NOS, Department of Commerce. Remittance from outside the United States should be made either by an International Money Order or by a check payable on a U.S. bank. Chart catalogs, which include a listing of authorized sales agents, are free upon request. The National Ocean Service maintains over-the-counter cash, Visa, Mastercard, check and money order sales offices at Distribution Division, Riverdale (see address above), and at 222 West 7th Avenue, Box 38, Anchorage, Alaska 99513-7574, telephone: 907-271-5040.

(7) **National Ocean Service Offices**

(8) Washington, DC (Headquarters): Assistant Administrator, National Ocean Service, NOAA, Herbert C. Hoover Bldg., 14th Street and Constitution Avenue, NW, Room 5805, Washington, DC 20230-0001.

(9) **Silver Spring:** Chief, Office of Coast Survey (N/CS), National Ocean Service, NOAA, 1315 East-West Highway, Silver Spring, MD 20910-3282.

(10) **Norfolk:** Director, Atlantic Marine Center, NOS, National Oceanic and Atmospheric Administration, 439 West York Street, Norfolk, VA 23510-1114.

(11) **Seattle:** Director, Pacific Marine Center, NOS, National Oceanic and Atmospheric Administration, 1801 Fairview Avenue East, Seattle, WA 98102-3767.

(12) **Charts and Publications-National Ocean Service**

(13) **Nautical Charts** (See Chart Catalogs)

(14) United States Coastal and Intracoastal waters, and possessions.

(15) Great Lakes, Lake Champlain, New York State Canals, and the St. Lawrence River-St. Regis to Cornwall, Canada.

(16) **Publications** (See the publication **Dates of Latest Editions** for latest editions editions and prices)

(17) **Coast Pilot**

(18) U.S. Coast Pilot 1, Atlantic Coast, Eastport to Cape Cod.

(19) U.S. Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook.

(20) U.S. Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry.

(21) U.S. Coast Pilot 4, Atlantic Coast, Cape Henry to Key West.

(22) U.S. Coast Pilot 5, Atlantic Coast-Gulf of Mexico, Puerto Rico, and Virgin Islands.

(23) U.S. Coast Pilot 6, Great Lakes, Lakes Ontario, Erie, Huron, Michigan, and Superior, and St. Lawrence River.

(24) U.S. Coast Pilot 7, Pacific Coast, California, Oregon, Washington, and Hawaii.

(25) U.S. Coast Pilot 8, Pacific Coast Alaska, Dixon Entrance to Cape Spencer.

(26) U.S. Coast Pilot 9, Pacific and Arctic Coasts, Alaska-Cape Spencer to Beaufort Sea.

(27) **Distance Tables**

(28) Distances Between United States Ports.

(29) **Water Levels**

(30) Great Lakes Water Levels, (year): Daily and Monthly Average Water Surface Elevations, published annually.

(31) Great Lakes Water Levels: Monthly and Annual Average Water Surface Elevations, 1860-1975, published every 5 years.

(32) Hydrograph of Lake Levels, a hydrograph of monthly mean levels of the Great Lakes from 1860 to date and of Lake St. Clair from 1898 to date.

(33) **Charts and Publications-Other U.S. Government Agencies**

(34) A partial list of publications and charts considered of navigational value is included for the ready reference of the mariner. In addition to the agents located in the principal seaports handling publication sales, certain libraries have been designated by the Congress of the United States to receive the publications as issued for public review.

(35) **Government Printing Office.**–Publications of the U.S. Government Printing Office may be ordered from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325. Orders may be charged to Visa or Mastercard by calling (202) 783-1800 during normal business hours.

(36) **National Imagery and Mapping Agency Procurement Information.**–Unclassified publications and charts of the National Imagery and Mapping Agency (NIMA) are available from National Ocean Service Distribution Division (see Sales Information, beginning of this Appendix). Classified NIMA publications and charts are available to authorized users from National Imagery and Mapping Agency from the Defense Supply Center Richmond (Attn: JNAA), 8000 Jefferson Davis Highway, Richmond, VA 23297-5336. Defense Supply Center Richmond, Customer Assistance Office may be contacted at 1-800-826-0342.

(37) **Nautical Charts**

(38) U.S. Waters:

(39) Apalachicola, Chattahoochee and Flint Rivers Navigation Charts, Alabama River Charts, and Black Warrior-Tombigbee Rivers River Charts: Published and for sale by U.S. Army Engineer District Mobile, P.O. Box 2288, 109 St. Joseph Street, Mobile, Ala. 36628.

(40) Flood Control and Navigation Maps of the Mississippi River, Cairo, Ill. to the Gulf of Mexico: Published by Mississippi River Commission and for sale by U.S. Army Engineer District Vicksburg, P.O. Box 60, U.S. Post Office and Courthouse, Vicksburg, Miss. 39180.

(41) Upper Mississippi River Navigation Charts (Mississippi River Cairo, Ill. to Minneapolis, Minn.): Published by U.S. Army Engineer North Central Division and for sale by U.S. Army Engineer District St. Louis, 210 N. Tucker Boulevard, St. Louis, Mo. 63101.

(42) Charts of the Illinois Waterway, from Mississippi River at Grafton, Ill. to Lake Michigan at Chicago and Calumet Harbors: Published and for sale by U.S. Army Engineer District Rock Island, Clock Tower Bldg., Rock Island, Ill. 61201.

(43) Foreign Waters: Published by National Imagery and Mapping Agency (see National Imagery and Mapping Agency Procurement Information above).

(44) **Marine Weather Services Charts**: Published by the National Weather Service; for sale by NOS Distribution Division (see Sales Information above).

(45) **Publications**

(46) **Notices to Mariners**:

(47) The Local Notice to Mariners is available without charge upon application to the appropriate Coast Guard District Commander (see address further on). The National Imagery and Mapping Agency Notice to Mariners is available without charge by operators of ocean-going vessels (see National Imagery and Mapping Agency Procurement Information above).

(48) **Special Notice to Mariners** are published annually in National Imagery and Mapping Agency Notice to Mariners 1. These notices contain important information of considerable interest to all mariners. Interested parties are advised to read these notices.

(49) **Light Lists (United States and Possessions)**: Published by U.S. Coast Guard; for sale by the Government Printing Office. (See Government Printing Office, early this appendix.)

(50) **List of Lights (Foreign Countries)**: Published by National Imagery and Mapping Agency (see National Imagery and Mapping Agency Procurement Information above).

(51) **Sailing Directions (Foreign Countries)**: Published by National Imagery and Mapping Agency (see National Imagery and Mapping Agency Procurement Information above).

(52) **Radio Navigational Aids**, Pub. 117: Published by National Imagery and Mapping Agency (see National Imagery and Mapping Agency Procurement Information above).

(53) **American Practical Navigator (Bowditch)** (Pub. 9): Published by National Imagery and Mapping Agency (see National Imagery and Mapping Agency Procurement Information above).

(54) **International Code of Signals** (Pub. 102): Published by National Imagery and Mapping Agency (see National Imagery and Mapping Agency Procurement Information above).

(55) The **Nautical Almanac**, the **Air Almanac**, and **Astronomical Almanac**: Published by U.S. Naval Observatory; for sale by Government Printing Office. (see Government Printing Office, above.)

(56) **Marine Product Dissemination Information**: maintained by the National Weather Service on the internet, (http://www.nws.noaa.gov/om/marine/home.htm).

(57) **Navigation Rules**: Navigation Rules, International-Inland (COMDTINST M16672.2 series): Published by the U.S. Coast Guard; for sale by Government Printing Office. (see Government Printing Office, early this appendix.)

(58) **Federal Requirements for Recreational Boats**: Published by U.S. Coast Guard; available without charge by contacting the toll free Boating Safety Hotline (telephone, 800-368-5647).

(59) **Port Series of the United States**: Published and sold by Corps of Engineers, U.S. Army, Water Resources Support Center, Port Facilities Branch, Casey Building, Fort Belvoir, VA 22060-5586.

(60) **Maritime Radio Users Handbook**: Published and sold by Radio Technical Commission for Maritime Services, 655 Fifteenth Street, N.W., Suite 300, Washington, DC 20005-5701.

(61) **U.S. Government Agencies**

(62) **U.S. Army Corps of Engineers (USACE) Offices**

(63) District office addresses and areas of jurisdiction covered by this Coast Pilot:

(64) **Buffalo District**: 1776 Niagara Street, Buffalo, NY 14207-3199. The U.S. waters and tributary waterways of St. Lawrence River from the New York State-Canadian boundary to the head of the river, Lake Ontario from St. Lawrence River to the mouth of Niagara River, Niagara River, and Lake Erie from the head of Niagara River to the Ohio-Michigan boundary.

(65) **Chicago District**: 111 North Canal Street, Chicago, IL 60606-7206. The S end of Lake Michigan and its tributary waterways from and including Michigan City, Indiana, to the Illinois-Wisconsin boundary; including Calumet River lakeward of the East 130th Street bridge.

(66) **Detroit District**: Patrick V. McNamara Bldg., 477 Michigan Avenue, Detroit, Mich. 48226. Lakeshore areas and tributary waters of the States of Michigan, Wisconsin, and Minnesota.

(67) **New York District**: 26 Federal Plaza, New York, NY 10278-0090. Hudson River, Lake Champlain and its tributary waterways, and the Great Lakes-Hudson River Waterway Improvement.

(68) **Rock Island District**: Clock Tower Bldg., Rock Island, Ill. 61204-2004. Calumet River upstream of the East 130th Street bridge, Little Calumet River, Calumet Sag Channel, Lockport Lock and Dam, Des Plaines River below its confluence with the Chicago Sanitary and Ship Canal, and Illinois River from its head at Des Plaines River to the new La Grange Lock and Dam.

(69) **St. Louis District**: 210 North Tucker Boulevard, St. Louis, MO 63101-1986. Illinois River from the new La Grange Lock and Dam to its confluence with Mississippi River.

(70) **Environmental Protection Agency (EPA) Offices.**– Regional offices and States in the EPA coastal regions and Great Lakes:

(71) **Region I** (New Hampshire, Maine, Massachusetts, Connecticut, Rhode Island, Vermont): J. F. Kennedy Federal Bldg., Boston, Mass. 02203.

(72) **Region II** (New Jersey, New York, Puerto Rico, Virgin Islands): 26 Federal Plaza, New York, N.Y. 10278.

(73) **Region III** (Delaware, Maryland, Virginia, District of Columbia, Pennsylvania): 841 Chestnut Street, Philadelphia, Pa. 19107.

(74) **Region V** (Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin): 230 South Dearborn Street, Chicago, Ill. 60604.

(75) **Coast Guard District Offices**

(76) Commander, First Coast Guard District, 408 Atlantic Avenue, Boston, MA 02210-3350. Maine; New Hampshire; Vermont; Massachusetts; Rhode Island; Connecticut; New York except that part north of latitude 42°N. and west of longitude 74°39″W.; that part of New Jersey north of 39°57″N. (about the mouth of Toms River), east of 74°27″W., and northeast of a line from 39°57″N. 74°47′27″W., northwest to the New York, New Jersey and Pennsylvania boundaries at Tristate.

(77) Commander, Second Coast Guard District, 1222 Spruce Street, St. Louis, Missouri 63103-2382. Arkansas, West Virginia Kentucky, Tennessee, Oklahoma, Kansas, Nebraska, Nort

Dakota, South Dakota, Wyoming, Colorado, Iowa, and Missouri; that part of Pennsylvania S of 14°N., and W of 79°W.; those parts of Ohio and Indiana S of 41°N.; Illinois, except that part N of 41°N. and E of 90°W.; that part of Wisconsin S of 46°20′N., and W of 90°W.; that part of Minnesota S of 46°20′N.; that part of Alabama N of 34°N.; that part of Mississippi N of the S boundaries of the counties of Washington, Sunflower, Leflore, Grenada, Calhoun, Chickasaw, Lee, Prentiss, and Tishomingo Counties, except that portion of the Tennessee-Tombigbee Waterway S of the Bay Springs Lock and Dam.

(78) Commander, Ninth Coast Guard District, 1240 East 9th Street, Cleveland, Ohio 44199-2060. Michigan, New York N of 42°N. and W of 74°39′W.; Pennsylvania N of 41°N. and W of 78°55′W.; that part of Ohio and Indiana N of 41°N.; that part of Illinois N of 41°N. and E of 90°W.; Wisconsin, except that part S of 46°20′N. and W of 90°W.; and that part of Minnesota N of 46°20′N.

(79) **Note:** A Marine Safety Office combines the functions of the Captain of the Port and Marine Inspection Office.

(80) The symbol **(D)** preceding an office indicates that a Documentation Office is at the same address.

(81) **Coast Guard Marine Safety Offices**

(82) Buffalo, N.Y.: Federal Bldg., 111 W. Huron Street 14202-2395.

(83) Toledo, Ohio: Federal Bldg., 234 Summit Street 43604-1590.

(84) Cleveland, Ohio: 1055 East Ninth Street 44114-1092.

(85) Detroit, Mich.: Foot of Mount Elliot Avenue 48207-4380.

(86) Chicago, IL: 215 West 83rd Street, Suite D, 60521-7059.

(87) Milwaukee, WI: 2420 S. Lincoln Memorial Drive 53207-1997.

(88) Duluth, MN: Canal Park 55802-2352.

(89) Sault Ste. Marie, MI: c/o U.S. Coast Guard Group 49783-9501.

(90) **Coast Guard Marine Safety Detachment Offices**

(91) Sturgeon Bay, WI: 57 North 12th Avenue 54235-0446.

(92) Grand Haven, MI: 650 Harbor Avenue 49417-1752.

(93) Massena, NY: P.O. Box 728, 180 Andrews Street 13662-0728.

(94) **Coast Guard Documentation Offices**

(95) Cleveland, Ohio: 1240 East Ninth Street 44199-2060.

(96) **Coast Guard Stations.**–The stations listed are in the area covered by this Coast Pilot. They have search and rescue capabilities and may provide lookout, communications, and/or patrol functions to assist vessels in distress. The National VHF-FM Distress System provides continuous coastal radio coverage outwards to 20 miles on channel 16. After contact on channel 16, communications with the Coast Guard should be on channel 22. If channel 22 is not available to the mariner, communications may be made on channel 12. Selected stations guard the International Radiotelephone Distress, Safety and Calling Frequencies.

(97) **St. Lawrence River:**

(98) Alexandria Bay, N.Y. (44°19.9′N., 75°56.1′W.). On the S shore of Wellesley Island, 1,400 feet W of Light 195 on Cherry Island.

(99) **Lake Ontario:**

(100) Sackets Harbor, N.Y. (43°56.9′N., 76°07.3′W.). On the S side of the harbor, about 800 feet S of Navy Point Light. (Seasonal; no continuous radio guard.)

(101) Oswego, N.Y. (43°27.8′N., 76°31.0′W.). On S side of basin about 0.7 mile S of West Pierhead Light.

(102) Sodus Bay, N.Y., Sodus Point Station (43°16.4′N., 76°58.5′W.). On W side of harbor entrance. (Seasonal; no continuous radio guard.)

(103) Rochester, N.Y. (43°15.4′N., 77°36.2′W.). E side of entrance to harbor.

(104) Youngstown, N.Y., Niagara Station (43°15.7′N., 79°03.8′W.). E side of entrance to Niagara River.

(105) **Lake Erie:**

(106) Buffalo, N.Y., (42°52.6′ N., 78°53.2′ W.). On the S pier at the mouth of Buffalo River.

(107) Erie, Pa. (42°09.2′ N., 80°04.7′ W.). On the N side of the entrance channel, near Erie Harbor Inner Range Rear Light.

(108) Ashtabula, Ohio (41°54.1′ N., 80°47.9′ W.). On E side of river, about 700 feet N of the highway bridge.

(109) Fairport, Ohio (41°45.6′ N., 81°16.9′ W.). On W side of mouth of Grand River.

(110) Cleveland, Ohio (41°30.6′ N., 81°41.6′ W.). Near the W end of Burke Lakefront Airport on the S side of a small basin 1.1 miles E of East Breakwater Light.

(111) Lorain, Ohio (41°28.2′ N., 82°10.7′ W.). E side of mouth of Black River.

(112) Marblehead, Ohio (41°32.6′ N., 82°43.8′ W.). On Point Marblehead, 1.1 miles 297° from Marblehead Light.

(113) Toledo, Ohio (41°41.6′ N., 83°28.4′ W.). In Bay View Park, on NW side of the Maumee River near its mouth.

(114) **Detroit River:**

(115) Detroit, Mich., Belle Isle Station (42°20.4′ N., 82°57.7′ W.). At Belle Isle Light near the upper end of the island.

(116) **Lake St. Clair:**

(117) St. Clair Shores, Mich. (42°28.4′ N., 82°52.8′ W.). Near the end of Revere Avenue about 0.7 mile N of Miller Memorial Light.

(118) Selfridge Air National Guard Base, Mich., Detroit Air Station (42°36.5′ N., 82°50.5′ W.). W of Anchor Bay, about 3.5 miles WNW of Clinton River entrance.

(119) **St. Clair River:**

(120) St. Clair Flats, Mich. (42°33.1′ N., 82°39.0′ W.). On NW side of river at front light of St. Clair Flats Canal Range.

(121) Port Huron, Mich. (43°00.3′ N., 82°25.3′ W.). On W side of entrance to St. Clair River, near Fort Gratiot Light.

(122) **Lake Huron:**

(123) Harbor Beach, Mich. (43°51.3′N., 82°39.1′W.). N of Harbor Beach at Waterworks Park. (Seasonal; no continuous radio guard.)

(124) Saginaw River, Mich. (43°37.7′N., 83°50.3′W.). On E side of Saginaw River about 1.7 miles above the river entrance.

(125) Tawas, Mich. (44°15.5′ N., 83°26.2′ W.). On Tawas Point, about 0.7 mile NE of Tawas Light.

(126) St. Ignace, Mich. (45°51.3′ N., 84°42.2′ W.). Near Michigan Department of State Highways dock on E end of Graham Point.

(127) **Lake Michigan:**

(128) Charlevoix Mich. (45°19.0′N., 85°14.7′W.). N side of Pine River entrance to Lake Charlevoix.

(129) Traverse City, Mich., Air Station (44°44.7′N., 85°34.9′W.). At SE corporate limits of the city, about 2.5 miles SE of Duncan L. Clinch Yacht Harbor.

(130) Frankfort, Mich. (44°37.8′N., 86°14.6′W.). N side of entrance to harbor.

(131) Manistee, Mich. (44°15.0′N., 86°20.4′W.). N side of entrance to Manistee Harbor. (Seasonal station.)

(132) Ludington, Mich. (43°57.2′N., 86°27.6′W.). N side of entrance to harbor.

(133) Muskegon, Mich. (43°13.7′N., 86°20.3′W.). S side of entrance to harbor. (Seasonal station.)

(134) Grand Haven, Mich. (43°03.6′N., 86°14.8′W.). N side of the mouth of the Grand River.

(135) Holland, Mich. (42°46.5′N., 86°12.1′W.). N side of harbor entrance. (Seasonal station.)

(136) South Haven, Mich. (42°24.1′N., 86°17.0′W.). S side of entrance to Black River. (Seasonal, weekends only; no continuous radio guard.)

(137) St. Joseph, Mich. (42°06.8′N., 86°29.1′W.). N side of harbor entrance.

(138) Michigan City, Ind. (41°43.4′N., 86°56.4′W.). E side of entrance to harbor.

(139) Calumet Harbor, Ill. (41°43.0′N., 87°31.6′W.). Lakefront in the S part of Calumet Park, about 1.1 miles S of Calumet River entrance.

(140) Glenview, Ill., Chicago Air Station (42°05.2′N., 87°49.7′W.). About 7.5 miles W of Wilmette Harbor, Ill.

(141) Wilmette, Ill. (42°04.6′N., 87°41.0′W.). N side of harbor entrance.

(142) Kenosha, Wis. (42°35.4′N., 87°49.0′W.). On E side of the inner basin.

(143) Milwaukee, Wis., Coast Guard Station, Group Office, and Base (43°00.1′N., 87°53.2′W.). At S end of outer harbor, about 0.8 mile SW of South Entrance Light.

(144) Sheboygan, Wis. (43°45.0′N., 87°42.3′W.). Near inner end of old N pier stub.

(145) Two Rivers, Wis. (44°08.8′N., 87°33.7′W.). NE side of entrance to harbor.

(146) Sturgeon Bay, Wis. (44°47.7′N., 87°18.7′W.). At E entrance, on N side.

(147) Plum Island, Wis. (45°18.8′N., 86°57.0′W.). On N side of Plum Island. (Seasonal station.)

(148) Green Bay, Wis. (44°32.2′N., 88°00.2′W.). On the E side of the mouth of the Fox River. (Seasonal station.)

(149) **St. Marys River:**

(150) Sault Ste. Marie, Mich., Coast Guard Station, Group Office, and Base (46°30.0′N., 84°20.3′W.). At Sault Ste. Marie, Mich., about 0.5 mile below the locks.

(151) **Lake Superior:**

(152) Grand Marais, Mich. (46°40.6′N., 85°58.4′W.). On the W side of harbor entrance channel. (Seasonal, weekends only; no continuous radio guard.)

(153) Munising, Mich. (46°24.9′N., 86°39.7′W.). In the town of Munising at the Munising Range Front Light. (Seasonal, weekends only; no continuous radio guard.)

(154) Marquette, Mich. (46°32.7′N., 87°22.7′W.). Near inner end of breakwater, about 1,000 feet SW of Marquette Light.

(155) Keweenaw Waterway, Mich., Portage Hancock Station (47°07.5′N., 88°34.7′W.). On E bank of canal about 0.2 mile W of the lift bridge at Hancock.

(156) Bayfield, Wis. (46°48.5′N., 90°48.8′W.). On S side of city, about 1,000 feet SW of Bayfield Harbor South Breakwater Light.

(157) Duluth, Minn. (46°46.3′N., 92°05.4′W.). On Minnesota Point, about 0.5 mile S from Duluth Ship Canal.

(158) Grand Marais, Minn., North Superior Station (47°44.8′N., 90°20.0′W.). At SE side of harbor, about 1,300 feet ENE of Grand Marais Light. (Seasonal station.)

(159) **Lake Champlain:**

(160) Burlington, Vt. (44°28.8′N., 73°13.5′W.). 1,650 feet E of Burlington Harbor North Breakwater Light, on Battery Park.

(161) **Coast Guard Radio Broadcasts.**–Urgent, safety, and scheduled marine information broadcasts are made by Coast Guard radio stations. In general, these broadcasts provide information vital to vessels operating in the approaches and coastal waters of the United States including the Great Lakes, Puerto Rico and U.S. Virgin Islands. Types of broadcasts are as follows:

(162) **Scheduled broadcasts.**–U.S. Coast Guard radio stations make scheduled broadcasts on a prepublished schedule of intervals of 12 hours. After the preliminary announcements on VHF-FM channel 16 the station advises shifting to working frequency: VHF-FM channel 22.

(163) **Safety broadcasts.**–U.S. Coast Guard stations which make scheduled broadcasts issue safety broadcasts upon receipt and on the next scheduled broadcast. Safety broadcasts are preceded by the safety signal SECURITY. After the preliminary signal on VHF-FM channel 16, the station may announce shifting to working frequency: VHF-FM channel 22.

(164) **Urgent broadcasts.**–U.S. Coast Guard stations which make scheduled broadcasts issue urgent broadcasts upon receipt and on schedule until canceled. Urgent broadcasts are preceded by the urgent signal, PAN. Both the urgent signal and message may be transmitted on VHF-FM channel 16.

(165) **Times of broadcasts.**–The following Coast Guard radio stations make scheduled broadcasts at the times indicated; the control station is given, followed by the area of coverage, followed by remote antenna sites.

(166) **NMD-47**, Buffalo Group, Buffalo (Lakes Erie and Ontario); Oswego, Rochester, Thirtymile Point, Dunkirk, Alexandria Bay, Ashtabula. Every 6 hours beginning at 0225 G.m.t.

(167) **NMD-25**, Detroit Group, Detroit (Lakes Erie, St. Clair, Huron; Detroit and St. Clair Rivers); Cleveland, Port Huron, Bell Isle, Port Austin, Toledo, Alpena, Marblehead. Every 12 hours beginning at 0135 G.m.t.

(168) **NMD-32**, Grand Haven Group, Grand Haven (Lake Michigan); Holland, Frankfort, Ludington. Every 6 hours beginning at 0235 G.m.t.

(169) **NMP-9**, Milwaukee Group, Milwaukee (Lake Michigan); Sturgeon Bay, Two Rivers, Chicago, Milwaukee. Every 3 hours beginning at 0255 G.m.t.

(170) **NOG**, Sault Ste. Marie Group, Sault Ste. Marie (Lakes Huron, Michigan and E. Lake Superior); Goetzville (46°04′N., 84°06′W.), Sault Ste. Marie, Beaver Island, Grand Marais, Escanaba, Marquette. Every 3 hours beginning at 0005 G.m.t.

(171) **NOG-14**, Duluth Group, Duluth (W. Lake Superior); Calumet, Grand Marais, Bayfield, Duluth. Every 3 hours beginning at 0135 G.m.t.

(172) **Customs Ports of Entry and Stations**

(173) Vessels may be entered and cleared at any port of entry or customs station, but at the latter only with advance authorization from the Customs Service district director.

(174) **Northeast Region**

(175) St. Albans District:

(176) Ports of Entry: St. Albans, Burlington, and Highgate Springs/Alburg, Vt.

(177) Ogdensburg District:

(178) Ports of Entry: Ogdensburg, Alexandria Bay, Cape Vincent, Champlain-Rouses Point, Clayton, and Massena, N.Y.

(179) Buffalo District:

(180) Ports of Entry: Buffalo-Niagara Falls, Oswego, Rochester, and Sodus Point, N.Y.

(181) **North Central Region**

(182) Duluth District:

(183) Ports of Entry: Duluth and Grand Portage, Minn.; Superior and Ashland, Wis.

(184) Milwaukee District:

(185) Ports of Entry: Milwaukee, Green Bay, Manitowoc, Marinette, Racine, and Sheboygan, Wis.

(186) Chicago District:

(187) Port of Entry: Chicago, Ill.

(188) Cleveland District:

(189) Ports of Entry: Erie, Pa.; Cleveland, Ashtabula/Conneaut, and Toledo/Sandusky, Ohio.

(190) Customs Stations: Fairport, Lorain, Marblehead-Lakeside, and Put-in-Bay, Ohio.

(191) Detroit District:

(192) Ports of Entry: Detroit, Muskegon, Port Huron, Saginaw-Bay City, and Sault Ste. Marie, Mich.

(193) U.S. Customs Representative: Drummond, Mich.

(194) Customs Stations: Algonac, Mich., Alpena, Mich., De Tour, Mich., Escanaba, Mich., Grand Haven, Mich., Houghton, Mich., Marine City, Mich., Marquette, Mich., Rogers City, Mich.

(195) **National Weather Service Offices.**–The following offices will provide forecasts and climatological data or arrange to obtain these services from other offices. They will also check barometers in their offices or by telephone; refer to the local telephone directory for numbers.

(196) Alpena, Mich.: Alpena County Regional Airport, 49707.

(197) Ann Arbor, MI: 200 E. Liberty Street 48107.

(198) Buffalo, N.Y.: Greater Buffalo International Airport, East Terminal 14225.

(199) Chicago, IL: 333 University Drive, Romeoville, IL 60441.

(200) Cleveland, Ohio: Cleveland Hopkins International Airport, Federal Facilities Bldg. 44135.

(201) Detroit, Mich.: Metropolitan Airport, Bldg. 348, 48242.

(202) Duluth, Minn.: International Airport 55811.

(203) Erie, Pa.: International Airport 16505.

(204) Grand Rapids, MI: 5500 44th Street, SE, Terminal Building 49512.

(205) Green Bay, Wis.: 2511 South Point Road, 54313-5525.

(206) Marquette, Mich.: 134 Airport Drive 49866.

(207) Milwaukee, Wis.: 5150 South Howell Avenue 53207-6190.

(208) Muskegon, Mich.: Muskegon County Airport, 99 Sinclair Drive 49441.

(209) Rochester, N.Y.: Greater Rochester International Airport, One Airport Way 14624.

(210) Sault Ste. Marie, Mich.: 214 W. 14th Avenue 49783.

(211) Toledo, Ohio: Toledo Express Airport, 11013 Airport Highway, Swanton, Ohio 43558.

(212) **National Weather Service Weather Broadcasts:**

(213) **Lake Weather Broadcasts (LAWEB),** issued by the National Weather Service, are plain language broadcasts that include reports of wind direction and speed and wave heights from shore stations and ships underway on the lakes. Visibility and weather are included when the visibility is less than $\frac{5}{8}$ mile. The observations are taken $1\frac{1}{2}$ hours before the time of broadcast. Outside the navigation season, only Lake Michigan is included in the broadcasts. **Marine Forecasts (MAFOR),** also issued by the National Weather Service, are coded weather forecasts which are preceded by a plain language description of the current weather map. (See National Weather Service forecasts and warnings, chapter 1.)

(214) The following radio stations broadcast LAWEBs at 0245, 0845, 1445, and 2045 e.s.t., and MAFORs at 0430, 1030, 1630, and 2230 e.s.t.

(215) WLC, Tawas City, Mich., channel 26, 2514 kHz, and 4369.8 kHz

(216) WLC, Rogers City, Mich., channel 26

(217) WLC, Charlevoix, Mich., channel 26

(218) WLC, Sault Ste. Marie, Mich., channel 26

(219) A schedule of Coast Guard radio broadcasts which include weather information is contained elsewhere in the appendix.

(220) **NOAA Weather Radio.**–National Weather Service VHF-FM radio stations provide mariners with continuous FM broadcasts of weather warnings, forecasts, radar reports, and surface weather observations. These stations usually transmit on 162.55 or 162.40 MHz. Reception range is up to 40 miles from the antenna site, depending on the terrain, type of receiver, and antenna used. The following VHF-FM radio stations with location of antenna are in or near the area covered by this Coast Pilot.

(221) WXL-31, Syracuse, N.Y., 162.55 MHz (42°58′N., 76°12′W.)

(222) KHA-53, Rochester, N.Y., 162.40 MHz (43°08′N., 77°35′W.)

(223) KEB-98, Buffalo, N.Y., 162.55 MHz (42°38′N., 78°46′W.)

(224) KEC-58, Erie, Pa., 162.40 MHz (42°03′N., 80°00′W.)

(225) KHB-59, Cleveland, Ohio, 162.55 MHz (41°24′N., 81°51′W.)

(226) KHB-97, Sandusky, Ohio, 162.40 MHz (41°24′N., 82°49′W.)

(227) WXL-51, Toledo, Ohio, 162.55 MHz (41°37′N., 83°42′W.)

(228) KEC-63, Detroit, Mich., 162.55 MHz (42°28′N., 83°12′W.)

(229) KIH-29, Flint, Mich., 162.40 MHz (43°13′N., 83°43′W.)

(230) KIG-83, Alpena, Mich., 162.55 MHz (45°03′N., 83°43′W.)

(231) KIH-22, Traverse City, Mich., 162.40 MHz (44°45′N., 85°40′W.)

(232) WWF-36, Hesperia, Mich., 162.475 MHz (43°37′N., 86°04′W.)

(233) KIG-63, Grand Rapids, Mich., 162.55 MHz (42°52′N., 85°35′W.)

(234) WXJ-57, South Bend, Ind., 162.40 MHz (41°36′N., 86°11′W.)

(235) KWO-39, Chicago, Ill., 162.55 MHz (41°53′N., 87°38′W.)

(236) KEC-60, Milwaukee, Wis., 162.40 MHz (43°01′N., 88°23′W.)

(237) KIG-65, Green Bay, Wis., 162.55 MHz (44°24′N., 88°00′W.)

(238) KIG-74, Sault Ste. Marie, Mich., 162.55 MHz (46°22′N., 84°24′W.)

(239) KIG-66, Marquette, Mich., 162.55 MHz (46°31′N., 87°29′W.)

(240) WXK-73, Houghton, Mich., 162.40 MHz (47°02′N., 88°41′W.)

(241) KIG-64, Duluth, Minn., 162.55 MHz (46°50′N., 92°04′W.)

(242) **National Weather Service Port Meteorological Officers (PMOs).**–Port Meteorological Officers provide assistance on matters of weather chart interpretation, instruments, marine weather communications, and requirements affecting ship operations. (See **National Weather Service,** chapter 1, for further details.) PMO offices in the area covered by this Coast Pilot are as follows:

(243) Cleveland, OH: Cleveland HopkinsInternational Airport, Federal Facilities Building 44135.

(244) Chicago, IL: 333 W. University Drive, Romeoville, IL 60441.

(245) **Public Health Service Quarantine Stations.**–Stations where quarantine examinations are performed:

(246) Chicago, Ill.: U.S. Quarantine Station, O'Hare International Airport, P.O. Box 66012, 60666.

(247) At other ports, quarantine and/or medical examinations are usually performed by Public Health Service contract personnel or by quarantine inspectors from the nearest quarantine station. Inquiries concerning quarantine matters should be directed to the nearest quarantine station.

(248) **Food and Drug Administration (FDA) Regional Offices**

(249) **Northeast Region** (New York, Maine, Connecticut, New Hampshire, Vermont, Rhode Island): 830 Third Avenue, Brooklyn, NY 11232.

(250) **Mid-atlantic Region** (Delaware, Pennsylvania, Virginia, Maryland, Ohio, New Jersey): U.S. Customhouse, 2nd and Chestnut Streets, Philadelphia, PA 19106.

(251) **Southeast Region** (South Carolina, North Carolina, Georgia, Alabama, Louisiana, Mississippi, Florida, Puerto Rico: 60 Eight Street, N.E., Atlanta, GA 30309.

(252) **Midwest Region** (Illinois, Indiana, Michigan, Wisconsin): 20 N. Michigan Avenue, Chicago, IL 60602.

(253) **Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) Offices.**–Listed below are ports covered by this volume where APHIS inspectors are available to inspect plants and plant and animal products, and locations of Animal Import Centers where livestock and birds are inspected.

(254) Information on importation of plants, animals, and plant and animal products is available from APHIS, Department of Agriculture, Federal Building, 6505 Belcrest Road, Hyattsville, Md. 20782. The specific offices to contact are as follows: for plants, including fruits and vegetables, and plant products, Plant Protection and Quarantine, Room 635, telephone 301-436-6799; for animal products, Import-Export Animals and Products Staff, Room 756A, telephone 301-436-7885; and for live ruminants, swine, equines, and poultry and other birds, Veterinary Services, Import-Export Animals and Products Staff, Room 764, telephone 301-436-8590.

(255) **New York:**

(256) Rouses Point: St. John's Highway Border Station, Room 118, Route 9-B, P.O. Box 278, 12979.

(257) Buffalo: Federal Building, Room 1113, 111 W. Huron Street 14202.

(258) **Ohio:**

(259) Cleveland: Federal Building, Room 1749, 1240 E. 9th Street 44199.

(260) **Michigan:**

(261) Detroit: International Terminal, Room 228, Metropolitan Airport 48242.

(262) **Illinois:**

(263) Chicago: U.S. Custom House, Room 800, 610 S. Canal Street 60607.

(264) **Wisconsin:**

(265) Milwaukee: International Arrivals Terminal, General Mitchell Field 53207.

(266) **Minnesota:**

(267) Duluth: Board of Trade Bldg., Room 420, 301 W. First Street 55802.

(268) **Animal Import Centers:**

(269) Honolulu, Hawaii: 300 Ala Moana Boulevard, Room 4320, 96850.

(270) Miami, Fla., 8120 NW 53rd Street, Suite 102, 33166.

(271) Rock Tavern, N.Y.: New York Animal Import Center, Stewart Airport, Rural Route 1, Box 74, 12575.

(272) **Immigration and Naturalization Service Offices**

(273) **Illinois:**

(274) Chicago: Dirksen Federal Bldg., 219 South Dearborn Street 60604.

(275) **Michigan:**

(276) Algonac: 202 Fruit Street 48001.

(277) Detroit: Federal Bldg., 333 Mt. Elliott Street 48207.

(278) Marine City: 451 South Water Street 48039.

(279) Muskegon: International Terminal 49440.

(280) Port Huron: Pinegrove and Elmwood Streets 48060.

(281) Sault Ste. Marie: International Bridge Plaza 49783.

(282) Trenton: 23100 West Road 48183.

(283) **Minnesota:**

(284) Duluth: U.S. Courthouse and Customhouse, 515 West First Street 55802.

(285) Grand Marais: P.O. Box 685, 55604.

(286) Grand Portage: 55605.

(287) **New York:**

(288) Alexandria Bay: Heart Island off Alexandria Bay 13607.

(289) Buffalo: 68 Court Street 14202.

(290) Cape Vincent: Horne's Ferry Service 13618.

(291) Clayton: Riverside Drive 13624.

(292) Lewiston: P.O. Box 305, 14092.

(293) Massena: P.O. Box 195, Rooseveltown, 13683.

(294) Niagara Falls: Rainbow Bridge 14303.

(295) Ogdensburg: Ogdensburg-Prescott Bridge 13669.

(296) Rochester: 410 Old Post Office Bldg. 14614.

(297) Rouses Point: P.O. Box 247, 12979.

(298) Youngstown: 14301.

(299) **Ohio:**

(300) Ashtabula: Marine Bank Bldg., 325 Hulbert Avenue 44004.

(301) Cleveland: Anthony J. Celebrezze Federal Bldg., 1240 East 9th Street 44199.

(302) Sandusky: Post Office Bldg. 44870.

(303) Toledo: Federal Office Bldg., 234 Summit Street 43604.

(304) **Vermont:**

(305) Alburg: State Route 225, 05440.

(306) Burlington: Federal Bldg., Elmwood Avenue 05401.

(307) **Wisconsin:**

(308) Milwaukee: Federal Bldg., 517 East Wisconsin Avenue 53202.

(309) **Federal Communications Commission Offices**

(310) **District Field Offices:**

(311) Buffalo, N.Y.: 1307 Federal Bldg., 111 West Huron Street 14202.

(312) Chicago, Ill.: Park Ridge Office Center, 1550 Northwest Highway, Park Ridge 60068.

(313) Detroit, Mich.: 24897 Hathaway Street, Farmington Hills 48018.

(314) New York, N.Y.: 201 Varick Street 10014.

(315) St. Paul, Minn.: 691 Federal Bldg. and U.S. Courthouse, 316 North Robert Street 55101.

**Saint Lawrence Seaway Development Corporation**

(316) Saint Lawrence Seaway Development Corporation, 800 Independence Avenue SW., Washington, D.C. 20591.

(317) Saint Lawrence Seaway Development Corporation, Box 520, Massena, N.Y. 13662.

(318) **Pilotage.**–Pilot associations serving the Great Lakes are listed below with their dispatch office addresses and telephone numbers. Vessels entering the St. Lawrence River from sea make arrangements for pilotage service in advance through ships' agents to Laurentian Pilotage Authority. Vessels already on the Great Lakes and requiring pilotage service notify the nearest dispatch office 12 hours in advance and make a follow-up confirmation 4 hours in advance. (See **46 CFR 401,** chapter 2, and Pilotage, chapter 3 and at the beginning of chapters 4 through 13, for more information.)

(319) Great Lakes Pilotage Authority, Ltd., P.O. Box 95, Cornwall, ON K6H5R9, Canada (613-933-2991).

(320) Great Lakes Pilotage Authority, Ltd., P.O. Box 2008, Station B, St. Catharines, ON., Canada (416-934-2921).

(321) Lakes Pilots Association, P.O. Box 610902, 101 Water Street, Port Huron, MI 48061-0902; 810-982-1762 (Dispatch); 810-984-2541 (Office); FAX 810-984-2546.

(322) Laurentian Pilotage Authority, 1080 Beaver Hall Hill, Room 1806, Montreal 128, Que., Canada (514-283-6322).

(323) St. Lawrence Seaway Pilots Association, P. O. Box 274, 733 East Broadway, Cape Vincent, NY 13618-0274 (315-654-2900).

(324) Western Great Lakes Pilots Association, P.O. Box 248, 2231 Catlin Avenue, Suite 417, Superior, WI 54880-0248; 715-392-5200-Dispatch, 715-392-5204 (Office); FAX 715-392-`666; De Tour, MI 906-297-2112 (Dispatch); FAX 906-297-2126.

(325) **Canadian Government Agencies**

(326) Director General, Canadian Hydrographic Service, Department of Fisheries and Oceans, Ottawa, Ontario K1A 0E6, Canada.

(327) Hydrographic Chart Distribution Office, Department of Fisheries and Oceans, P.O. Box 8080, 1675 Russell Road, Ottawa, Ontario K1G 3H6, Canada.

(328) Canadian Coast Guard, Department of Fisheries and Oceans, 340 Slater Street, Ottawa, Ontario K1A 0N7.

(329) Canadian Communications Group, 45 Sacre-Coeur Boulevard, Hull, Quebec K1A OS9.

(330) **Canadian Customs Offices**

(331) Northern Ontario Region: 2265 St. Laurent Blvd., Ottawa, Ontario K1G4K3, Canada. Telephone 613-991-0551.

(332) Southern Ontario Region: 4 Robert Speck Parkway, Suite 450, Mississauga, Ontario L4Z1S1, Canada. Telephone 905-566-6041

(333) Prairie Region: 450-391 York Avenue, P.O. Box 1022, Winnipeg, Manitoba R3C0P5, Canada. Telephone 204-983-1845

(334) Vessels reporting from stations not manned by customs personnel may contact customs by calling, toll free, 1-800-267-0976.

(335) **St. Lawrence Seaway Management Corporation (Canada)**

(336) The St. Lawrence Seaway Management Corporation, 202 Pitt Street, Cornwall, Ontario K6J 3P7, Canada.

## CLIMATOLOGICAL TABLE

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA.

Sea level pressure is Station pressure reduced to sea level.

T means trace (not measurable) of precipitation.
Miss or <blank> is a missing value.

### ROCHESTER, NY (43°07'N,077°40'W) Elevation 547 feet (166.7 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1017.7 | 1018.1 | 1016.5 | 1015.2 | 1015.5 | 1014.7 | 1015.5 | 1016.6 | 1018.1 | 1018.4 | 1017.3 | 1018.1 | 1016.8 | 48 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 24.3 | 25.2 | 33.8 | 46.3 | 57.2 | 66.8 | 71.6 | 69.7 | 62.0 | 51.7 | 40.8 | 29.5 | 48.4 | 48 |
| Mean Daily Maximum | 31.3 | 32.9 | 41.8 | 55.9 | 67.8 | 77.6 | 82.2 | 80.0 | 72.1 | 61.2 | 47.9 | 35.9 | 57.4 | 48 |
| Mean Daily Minimum | 16.9 | 17.1 | 25.2 | 36.2 | 46.1 | 55.5 | 60.6 | 58.9 | 51.4 | 41.7 | 33.1 | 22.6 | 38.9 | 48 |
| Extreme Highest | 74 | 67 | 83 | 93 | 94 | 100 | 98 | 99 | 99 | 91 | 81 | 72 | 100 | 48 |
| Extreme Lowest | -17 | -19 | -6 | 13 | 26 | 35 | 42 | 36 | 30 | 20 | 5 | -12 | -19 | 48 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 52.5 | 55.7 | 40.2 | 27.0 | 30.3 | 21.8 | 30.0 | 41.2 | 55.8 | 59.1 | 47.5 | 56.2 | 43.1 | 48 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 7.1 | 10.4 | 15.7 | 18.8 | 20.2 | 20.5 | 20.7 | 21.9 | 21.8 | 21.2 | 9.4 | 6.6 | 16.2 | 48 |
| Percent of time Scattered | 11.8 | 13.8 | 15.2 | 16.2 | 19.7 | 25.1 | 28.0 | 24.7 | 22.0 | 18.0 | 13.5 | 12.5 | 18.4 | 48 |
| Percent of time Broken | 14.4 | 16.7 | 15.6 | 16.9 | 20.9 | 22.5 | 24.5 | 22.8 | 21.2 | 18.5 | 17.5 | 16.3 | 19.0 | 48 |
| Percent of time Overcast | 66.6 | 59.1 | 53.5 | 48.0 | 39.1 | 31.9 | 26.9 | 30.6 | 34.9 | 42.3 | 59.6 | 64.6 | 46.4 | 48 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 2.21 | 2.23 | 2.50 | 2.68 | 2.66 | 2.77 | 2.66 | 3.23 | 2.80 | 2.57 | 2.86 | 2.53 | 31.71 | 48 |
| Greatest Amount (inches) | 5.79 | 5.07 | 5.03 | 4.14 | 6.62 | 6.77 | 6.03 | 6.00 | 6.30 | 7.85 | 6.99 | 4.65 | 40.54 | 48 |
| Least Amount (inches) | 0.72 | 0.66 | 0.47 | 1.18 | 0.36 | 0.22 | 0.61 | 0.76 | 0.28 | 0.23 | 0.44 | 0.62 | 22.45 | 48 |
| Maximum in 24 hrs. (inches) | 1.26 | 1.75 | 1.46 | 1.79 | 3.45 | 2.56 | 3.25 | 2.32 | 3.47 | 2.94 | 2.02 | 1.49 | 3.47 | 48 |
| Mean Number of Days with Precipitation | 27 | 23 | 22 | 18 | 16 | 14 | 14 | 14 | 15 | 16 | 21 | 25 | 225 | 48 |
| Mean Snowfall Amount (inches) | 24.4 | 22.8 | 14.5 | 3.9 | 0.3 | 0.0 | 0.0 | 0.0 | T | 0.2 | 7.3 | 19.9 | 93.2 | 48 |
| Greatest Snowfall Amount (inches) | 60.4 | 64.8 | 40.3 | 20.2 | 10.9 | 0.0 | 0.0 | 0.0 | T | 2.6 | 23.4 | 46.1 | 151.7 | 48 |
| Least Snowfall Amount (inches) | 8.9 | 8.0 | 2.0 | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 6.0 | 43.4 | 48 |
| Maximum Snowfall in 24 hrs. (inches) | 18.2 | 18.4 | 17.5 | 10.4 | 10.7 | 0.0 | 0.0 | 0.0 | T | 2.6 | 11.9 | 18.0 | 18.4 | 48 |
| Mean Number of Days with Snow | 24 | 20 | 16 | 6 | 1 | 0 | 0 | 0 | Miss | 2 | 10 | 21 | 100 | 48 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.13 | 0.06 | 0.13 | 0.09 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.01 | 0.24 | 48 |
| Mean Wind Speed (Knots) | 10.4 | 10.1 | 9.9 | 9.7 | 8.5 | 7.9 | 7.3 | 7.0 | 7.4 | 7.9 | 9.3 | 9.7 | 8.8 | 48 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 1.8 | 2.7 | 2.8 | 3.5 | 4.1 | 3.6 | 3.6 | 3.2 | 3.1 | 2.6 | 1.9 | 1.8 | 2.9 | 48 |
| North Northeast | 1.4 | 2.0 | 2.8 | 3.7 | 4.0 | 3.0 | 2.5 | 3.3 | 2.6 | 2.2 | 1.5 | 1.0 | 2.5 | 48 |
| Northeast | 1.8 | 2.1 | 3.6 | 4.4 | 4.2 | 3.3 | 2.7 | 3.3 | 2.8 | 2.4 | 1.8 | 1.4 | 2.8 | 48 |
| East Northeast | 2.6 | 3.5 | 4.5 | 3.8 | 3.7 | 2.7 | 2.3 | 2.8 | 2.8 | 2.6 | 2.3 | 2.5 | 3.0 | 48 |
| East | 4.2 | 4.3 | 5.0 | 4.6 | 3.7 | 2.8 | 2.4 | 2.8 | 3.7 | 3.8 | 4.0 | 4.5 | 3.8 | 48 |
| East Southeast | 4.7 | 4.7 | 5.1 | 4.3 | 3.8 | 2.9 | 2.0 | 2.5 | 3.2 | 3.6 | 4.4 | 4.5 | 3.8 | 48 |
| Southeast | 3.8 | 3.8 | 3.7 | 3.6 | 3.9 | 3.0 | 2.4 | 2.9 | 3.7 | 4.1 | 4.3 | 4.3 | 3.6 | 48 |
| South Southeast | 3.7 | 3.6 | 3.6 | 3.4 | 4.0 | 3.5 | 2.9 | 3.5 | 4.5 | 4.9 | 5.8 | 4.5 | 4.0 | 48 |
| South | 7.2 | 6.2 | 5.5 | 6.1 | 6.9 | 8.2 | 8.5 | 8.4 | 10.1 | 9.8 | 9.1 | 8.3 | 7.9 | 48 |
| South Southwest | 8.9 | 7.4 | 5.9 | 6.2 | 8.4 | 11.2 | 12.3 | 13.1 | 13.5 | 12.6 | 11.2 | 10.6 | 10.1 | 48 |
| Southwest | 10.7 | 9.4 | 7.5 | 7.9 | 10.1 | 13.7 | 16.3 | 15.8 | 13.7 | 12.4 | 11.6 | 11.3 | 11.7 | 48 |
| West Southwest | 20.5 | 19.4 | 16.2 | 15.9 | 14.9 | 14.5 | 14.4 | 13.2 | 11.9 | 12.9 | 15.5 | 17.7 | 15.6 | 48 |
| West | 12.4 | 12.4 | 12.4 | 11.4 | 9.2 | 9.1 | 9.5 | 8.3 | 7.9 | 8.8 | 10.7 | 11.5 | 10.3 | 48 |
| West Northwest | 7.8 | 8.6 | 10.3 | 9.8 | 7.1 | 7.6 | 7.0 | 6.0 | 5.9 | 6.6 | 7.4 | 7.5 | 7.6 | 48 |
| Northwest | 4.1 | 4.6 | 5.2 | 5.5 | 5.3 | 5.2 | 5.7 | 4.9 | 4.5 | 4.3 | 4.4 | 4.3 | 4.8 | 48 |
| North Northwest | 2.4 | 2.7 | 2.8 | 3.3 | 3.4 | 3.2 | 2.7 | 2.9 | 2.7 | 2.3 | 1.8 | 2.3 | 2.7 | 48 |
| Calm | 2.0 | 2.6 | 3.0 | 2.7 | 3.4 | 3.0 | 3.0 | 3.5 | 3.4 | 4.5 | 2.5 | 2.3 | 3.0 | 48 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 8.5 | 8.9 | 8.1 | 7.8 | 7.7 | 7.4 | 7.2 | 7.2 | 7.1 | 7.8 | 7.6 | 9.0 | 7.8 | 48 |
| North Northeast | 10.7 | 11.6 | 10.0 | 9.7 | 9.0 | 8.2 | 8.5 | 8.4 | 8.7 | 9.6 | 9.1 | 10.7 | 9.3 | 48 |
| Northeast | 10.9 | 10.5 | 10.2 | 9.6 | 8.8 | 8.6 | 7.9 | 8.1 | 8.3 | 8.4 | 9.3 | 9.7 | 9.1 | 48 |
| East Northeast | 9.4 | 9.0 | 9.0 | 8.6 | 7.6 | 7.3 | 7.2 | 6.8 | 7.1 | 6.8 | 8.1 | 8.7 | 8.0 | 48 |
| East | 7.4 | 7.0 | 7.5 | 7.3 | 6.4 | 6.0 | 5.3 | 5.4 | 5.7 | 6.0 | 7.0 | 7.2 | 6.7 | 48 |
| East Southeast | 7.0 | 7.4 | 8.3 | 8.4 | 6.8 | 6.2 | 5.7 | 5.8 | 5.9 | 6.2 | 6.8 | 7.6 | 7.0 | 48 |
| Southeast | 6.9 | 7.1 | 8.1 | 7.8 | 6.9 | 6.0 | 5.7 | 5.4 | 5.7 | 6.4 | 7.3 | 7.2 | 6.8 | 48 |
| South Southeast | 7.9 | 8.0 | 8.6 | 9.2 | 7.6 | 6.6 | 6.0 | 5.6 | 6.5 | 6.9 | 8.0 | 7.7 | 7.4 | 48 |
| South | 8.0 | 7.9 | 8.1 | 7.7 | 7.0 | 6.6 | 6.0 | 5.8 | 6.7 | 7.2 | 8.0 | 7.7 | 7.2 | 48 |
| South Southwest | 9.2 | 8.5 | 8.4 | 8.2 | 7.7 | 7.1 | 6.6 | 6.5 | 7.5 | 7.5 | 8.4 | 8.9 | 7.7 | 48 |
| Southwest | 9.8 | 8.8 | 9.0 | 9.1 | 7.8 | 7.4 | 6.9 | 6.6 | 6.9 | 7.6 | 9.1 | 9.2 | 8.0 | 48 |
| West Southwest | 13.5 | 12.8 | 12.6 | 12.4 | 10.8 | 9.9 | 8.7 | 8.4 | 9.0 | 10.0 | 12.0 | 12.2 | 11.3 | 48 |
| West | 12.9 | 12.7 | 12.2 | 11.7 | 10.3 | 9.6 | 8.7 | 8.4 | 8.9 | 9.8 | 11.1 | 11.9 | 10.9 | 48 |
| West Northwest | 12.4 | 12.6 | 12.2 | 12.4 | 10.7 | 9.8 | 9.6 | 9.4 | 9.9 | 10.4 | 11.8 | 11.9 | 11.2 | 48 |
| Northwest | 11.6 | 11.3 | 11.0 | 10.5 | 9.8 | 9.4 | 9.2 | 8.9 | 9.0 | 10.0 | 11.0 | 12.1 | 10.3 | 48 |
| North Northwest | 9.7 | 9.9 | 9.0 | 9.1 | 9.0 | 8.4 | 8.1 | 8.3 | 8.5 | 8.4 | 9.5 | 10.2 | 9.0 | 48 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 8 | 9 | 10 | 10 | 10 | 10 | 11 | 13 | 12 | 11 | 11 | 10 | 125 | 48 |
| Percent Obs with Visibility <= 1/2 mile | 0.86 | 0.67 | 0.92 | 0.54 | 0.37 | 0.27 | 0.18 | 0.32 | 0.42 | 0.93 | 0.39 | 0.71 | 0.55 | 48 |

## CLIMATOLOGICAL TABLE

### NIAGARA FALLS, NY (43°06'N,078°57'W) Elevation 590 feet (180 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1019.0 | 1019.5 | 1017.8 | 1016.7 | 1016.6 | 1016.1 | 1017.3 | 1018.5 | 1019.4 | 1020.1 | 1018.7 | 1018.9 | 1018.2 | 34 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 25.0 | 25.8 | 33.1 | 46.6 | 56.3 | 66.5 | 71.6 | 70.2 | 61.8 | 51.9 | 41.0 | 29.0 | 48.0 | 19 |
| Mean Daily Maximum | 31.2 | 32.8 | 40.4 | 56.0 | 66.5 | 76.6 | 81.2 | 79.7 | 71.4 | 60.9 | 47.7 | 34.9 | 56.3 | 19 |
| Mean Daily Minimum | 18.3 | 18.4 | 25.3 | 36.6 | 45.5 | 55.9 | 61.4 | 60.3 | 51.6 | 42.4 | 33.8 | 22.6 | 39.2 | 19 |
| Extreme Highest | 64 | 61 | 78 | 85 | 88 | 95 | 94 | 93 | 96 | 81 | 79 | 61 | 96 | 19 |
| Extreme Lowest | -16 | -9 | -9 | 12 | 28 | 37 | 46 | 45 | 30 | 23 | 4 | -7 | -16 | 19 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 64.9 | 69.9 | 53.2 | 42.4 | 40.7 | 35.6 | 48.3 | 59.6 | 68.9 | 76.4 | 62.3 | 64.3 | 57.2 | 35 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 5.3 | 6.0 | 10.9 | 14.1 | 13.1 | 12.0 | 12.5 | 13.6 | 14.5 | 13.7 | 5.7 | 4.2 | 10.4 | 35 |
| Percent of time Scattered | 14.3 | 15.7 | 18.6 | 21.0 | 24.3 | 29.8 | 35.0 | 30.2 | 27.6 | 22.9 | 16.1 | 13.5 | 22.3 | 35 |
| Percent of time Broken | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 35 |
| Percent of time Overcast | 59.5 | 55.0 | 48.6 | 44.5 | 38.7 | 30.5 | 24.3 | 27.1 | 31.5 | 38.4 | 55.8 | 61.8 | 43.2 | 35 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 2.80 | 2.49 | 2.82 | 3.06 | 2.99 | 2.20 | 2.68 | 3.92 | 2.75 | 2.75 | 2.94 | 2.92 | 34.33 | 19 |
| Greatest Amount (inches) | 4.62 | 4.90 | 5.00 | 4.80 | 6.46 | 4.77 | 6.16 | 8.96 | 4.17 | 7.18 | 5.03 | 6.62 | 44.41 | 19 |
| Least Amount (inches) | 1.42 | 0.56 | 0.75 | 1.04 | 0.70 | 0.23 | 0.55 | 0.79 | 1.06 | T | 1.12 | 1.09 | 25.34 | 19 |
| Maximum in 24 hrs. (inches) | 1.51 | 3.13 | 2.30 | 1.60 | 1.86 | 2.52 | 1.66 | 3.24 | 2.75 | 2.42 | 2.25 | 1.43 | 3.24 | 19 |
| Mean Number of Days with Precipitation | 28 | 24 | 24 | 21 | 19 | 16 | 16 | 16 | 17 | 18 | 24 | 27 | 250 | 17 |
| Mean Snowfall Amount (inches) | 16.2 | 14.9 | 11.0 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | T | 0.2 | 4.6 | 14.9 | 64.2 | 19 |
| Greatest Snowfall Amount (inches) | 30.8 | 39.0 | 28.7 | 9.5 | 0.4 | 0.0 | 0.0 | 0.0 | T | 2.5 | 19.7 | 27.2 | 91.9 | 19 |
| Least Snowfall Amount (inches) | 0.4 | 0.2 | T | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 5.8 | 37.6 | 19 |
| Maximum Snowfall in 24 hrs. (inches) | 9.6 | 9.4 | 12.0 | 5.5 | 0.4 | 0.0 | 0.0 | 0.0 | T | 2.5 | 9.6 | 8.9 | 12.0 | 19 |
| Mean Number of Days with Snow | 25 | 21 | 17 | 6 | Miss | 0 | 0 | 0 | Miss | 2 | 12 | 23 | 106 | 17 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.19 | 0.05 | 0.09 | 0.04 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.10 | 0.05 | 35 |
| Mean Wind Speed (Knots) | 10.9 | 10.2 | 9.7 | 9.4 | 8.2 | 7.8 | 7.3 | 7.1 | 7.4 | 8.3 | 9.5 | 10.1 | 8.8 | 35 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 3.2 | 4.4 | 4.1 | 5.6 | 4.9 | 6.0 | 5.4 | 5.8 | 5.3 | 5.1 | 3.9 | 3.3 | 4.7 | 35 |
| North Northeast | 1.7 | 2.3 | 3.1 | 3.1 | 3.2 | 2.6 | 2.6 | 3.1 | 3.0 | 2.6 | 2.1 | 1.7 | 2.6 | 35 |
| Northeast | 2.2 | 3.2 | 4.7 | 4.2 | 4.5 | 3.6 | 2.9 | 4.1 | 3.7 | 3.7 | 3.1 | 2.7 | 3.5 | 35 |
| East Northeast | 3.7 | 5.0 | 6.6 | 5.7 | 5.2 | 4.2 | 2.9 | 4.0 | 4.4 | 4.5 | 3.7 | 4.1 | 4.5 | 35 |
| East | 7.4 | 7.6 | 8.5 | 7.7 | 6.4 | 4.8 | 4.1 | 5.0 | 6.6 | 7.1 | 7.1 | 7.9 | 6.7 | 35 |
| East Southeast | 2.7 | 2.1 | 2.8 | 2.8 | 2.8 | 2.1 | 2.1 | 2.8 | 3.2 | 3.1 | 3.4 | 3.6 | 2.8 | 35 |
| Southeast | 1.6 | 1.8 | 1.6 | 1.7 | 1.9 | 1.9 | 1.7 | 2.2 | 2.7 | 2.5 | 2.7 | 1.8 | 2.0 | 35 |
| South Southeast | 1.7 | 2.1 | 1.8 | 2.0 | 2.0 | 1.7 | 1.7 | 1.6 | 1.7 | 2.4 | 2.7 | 2.5 | 2.0 | 35 |
| South | 6.7 | 6.4 | 6.2 | 6.9 | 7.9 | 8.0 | 7.7 | 7.5 | 9.4 | 9.6 | 8.0 | 6.3 | 7.6 | 35 |
| South Southwest | 6.7 | 7.1 | 6.1 | 8.1 | 10.4 | 10.6 | 10.3 | 9.4 | 9.3 | 8.4 | 6.5 | 5.6 | 8.2 | 35 |
| Southwest | 11.1 | 11.6 | 10.4 | 12.4 | 14.0 | 16.1 | 17.7 | 14.7 | 11.8 | 10.5 | 10.0 | 9.7 | 12.5 | 35 |
| West Southwest | 15.5 | 12.6 | 8.5 | 8.5 | 8.0 | 8.8 | 8.5 | 8.5 | 7.4 | 8.0 | 10.9 | 13.5 | 9.9 | 35 |
| West | 16.7 | 11.7 | 9.8 | 6.7 | 5.4 | 5.5 | 6.0 | 6.2 | 7.2 | 9.6 | 15.5 | 17.2 | 9.9 | 35 |
| West Northwest | 5.5 | 6.8 | 7.9 | 7.2 | 5.6 | 5.5 | 5.3 | 5.3 | 6.4 | 5.6 | 6.5 | 5.7 | 6.1 | 35 |
| Northwest | 5.1 | 6.7 | 7.7 | 7.3 | 5.9 | 6.2 | 6.9 | 5.6 | 5.3 | 5.1 | 4.8 | 4.6 | 5.9 | 35 |
| North Northwest | 3.8 | 3.9 | 4.4 | 4.5 | 4.1 | 4.3 | 4.9 | 4.1 | 3.3 | 4.0 | 3.7 | 4.2 | 4.1 | 35 |
| Calm | 4.7 | 4.9 | 5.6 | 5.6 | 7.8 | 8.1 | 9.4 | 10.3 | 9.4 | 8.3 | 5.6 | 5.4 | 7.1 | 35 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 9.1 | 9.8 | 8.4 | 8.5 | 8.0 | 7.5 | 7.0 | 7.0 | 6.9 | 7.5 | 8.2 | 8.3 | 7.9 | 35 |
| North Northeast | 7.9 | 8.9 | 8.1 | 8.7 | 7.9 | 7.2 | 7.4 | 7.8 | 7.0 | 7.6 | 8.1 | 8.6 | 7.9 | 35 |
| Northeast | 8.6 | 9.4 | 9.0 | 9.2 | 8.3 | 8.0 | 7.0 | 7.1 | 7.2 | 7.9 | 8.2 | 8.1 | 8.2 | 35 |
| East Northeast | 8.7 | 8.8 | 9.4 | 9.5 | 8.7 | 7.3 | 6.6 | 6.7 | 6.7 | 7.1 | 7.6 | 8.3 | 8.1 | 35 |
| East | 8.5 | 8.5 | 9.0 | 8.8 | 7.6 | 6.7 | 6.1 | 6.0 | 6.2 | 6.8 | 7.3 | 8.5 | 7.7 | 35 |
| East Southeast | 6.8 | 6.5 | 7.7 | 7.9 | 6.6 | 5.9 | 6.1 | 5.8 | 5.7 | 6.0 | 6.7 | 6.7 | 6.5 | 35 |
| Southeast | 6.5 | 6.5 | 7.1 | 7.1 | 6.8 | 5.9 | 5.8 | 5.5 | 5.5 | 6.4 | 6.5 | 6.1 | 6.3 | 35 |
| South Southeast | 7.6 | 8.2 | 8.0 | 8.2 | 6.9 | 6.1 | 5.9 | 5.6 | 5.9 | 6.8 | 8.1 | 7.8 | 7.2 | 35 |
| South | 10.0 | 9.0 | 9.0 | 8.1 | 7.6 | 7.1 | 6.9 | 6.9 | 7.9 | 8.6 | 9.6 | 9.2 | 8.3 | 35 |
| South Southwest | 11.7 | 11.4 | 10.4 | 10.0 | 9.3 | 9.0 | 8.9 | 8.7 | 9.3 | 10.2 | 11.0 | 11.7 | 9.9 | 35 |
| Southwest | 14.0 | 12.3 | 12.1 | 11.5 | 10.3 | 9.9 | 9.5 | 9.3 | 10.0 | 11.3 | 12.0 | 13.1 | 11.1 | 35 |
| West Southwest | 14.5 | 13.4 | 12.7 | 12.0 | 10.2 | 10.0 | 9.5 | 9.5 | 9.9 | 11.0 | 12.3 | 13.1 | 11.9 | 35 |
| West | 12.7 | 11.8 | 11.6 | 10.7 | 9.3 | 8.8 | 7.5 | 7.5 | 8.6 | 10.4 | 11.3 | 11.9 | 10.8 | 35 |
| West Northwest | 11.5 | 10.9 | 11.0 | 10.7 | 9.5 | 9.4 | 8.6 | 8.2 | 8.8 | 10.0 | 10.4 | 11.3 | 10.1 | 35 |
| Northwest | 10.7 | 10.8 | 10.9 | 10.5 | 9.2 | 8.7 | 8.4 | 8.0 | 8.8 | 9.3 | 10.4 | 11.4 | 9.8 | 35 |
| North Northwest | 10.6 | 10.0 | 9.5 | 9.6 | 8.5 | 8.6 | 8.2 | 8.0 | 8.5 | 8.8 | 9.8 | 10.6 | 9.2 | 35 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 15 | 14 | 16 | 15 | 16 | 15 | 17 | 20 | 18 | 16 | 15 | 16 | 193 | 17 |
| Percent Obs with Visibility <= 1/2 mile | 1.23 | 1.51 | 1.37 | 0.70 | 0.65 | 0.32 | 0.27 | 0.43 | 0.52 | 1.11 | 0.91 | 1.39 | 0.87 | 35 |

## CLIMATOLOGICAL TABLE

### BUFFALO, NY (42°56'N,078°44'W) Elevation 705 feet (214.9 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1017.6 | 1017.7 | 1016.2 | 1015.2 | 1015.5 | 1015.0 | 1015.8 | 1016.8 | 1018.2 | 1018.4 | 1017.1 | 1017.9 | 1016.8 | 50 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 24.9 | 25.5 | 33.9 | 45.8 | 56.7 | 66.4 | 71.4 | 69.6 | 62.2 | 52.1 | 40.9 | 29.7 | 48.4 | 50 |
| Mean Daily Maximum | 31.2 | 32.5 | 41.6 | 54.8 | 66.3 | 76.0 | 80.6 | 78.7 | 71.2 | 60.5 | 47.4 | 35.8 | 56.5 | 50 |
| Mean Daily Minimum | 18.0 | 18.1 | 25.8 | 36.4 | 46.6 | 56.4 | 61.7 | 60.0 | 52.7 | 43.1 | 33.8 | 23.2 | 39.8 | 50 |
| Extreme Highest | 72 | 65 | 79 | 94 | 90 | 96 | 97 | 99 | 98 | 87 | 80 | 74 | 99 | 50 |
| Extreme Lowest | -16 | -20 | -7 | 12 | 26 | 36 | 46 | 38 | 23 | 20 | 7 | -10 | -20 | 50 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 50.8 | 52.1 | 36.5 | 27.4 | 29.6 | 24.9 | 32.8 | 43.1 | 57.3 | 59.4 | 45.5 | 54.2 | 42.7 | 50 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 5.4 | 7.3 | 13.3 | 15.0 | 16.1 | 15.6 | 15.6 | 17.3 | 18.1 | 18.5 | 6.7 | 5.0 | 12.9 | 50 |
| Percent of time Scattered | 13.0 | 15.1 | 15.9 | 17.9 | 22.1 | 28.2 | 30.7 | 26.9 | 24.8 | 20.1 | 14.2 | 13.1 | 20.2 | 50 |
| Percent of time Broken | 14.3 | 16.3 | 15.9 | 16.8 | 19.9 | 22.9 | 24.6 | 24.4 | 21.9 | 19.6 | 17.3 | 15.1 | 19.1 | 50 |
| Percent of time Overcast | 67.3 | 61.3 | 54.8 | 50.3 | 42.0 | 33.3 | 29.1 | 31.3 | 35.1 | 41.8 | 61.8 | 66.8 | 47.8 | 50 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 2.97 | 2.49 | 2.89 | 3.04 | 3.12 | 3.06 | 3.04 | 3.84 | 3.38 | 3.07 | 3.92 | 3.47 | 38.29 | 50 |
| Greatest Amount (inches) | 6.88 | 5.90 | 5.97 | 5.91 | 7.22 | 8.36 | 8.93 | 10.67 | 8.99 | 9.13 | 9.75 | 8.71 | 53.55 | 50 |
| Least Amount (inches) | 1.03 | 0.81 | 1.20 | 1.27 | 1.21 | 0.11 | 0.93 | 1.10 | 0.77 | 0.30 | 1.55 | 1.66 | 28.55 | 50 |
| Maximum in 24 hrs. (inches) | 1.83 | 2.08 | 2.05 | 1.66 | 3.41 | 5.01 | 3.38 | 3.88 | 4.89 | 2.55 | 2.10 | 1.73 | 5.01 | 50 |
| Mean Number of Days with Precipitation | 28 | 23 | 23 | 19 | 18 | 15 | 15 | 15 | 15 | 17 | 22 | 26 | 236 | 50 |
| Mean Snowfall Amount (inches) | 23.4 | 17.9 | 11.7 | 3.3 | 0.2 | 0.0 | 0.0 | 0.0 | T | 0.2 | 11.3 | 22.4 | 90.4 | 50 |
| Greatest Snowfall Amount (inches) | 68.3 | 54.2 | 29.3 | 15.0 | 7.9 | 0.0 | 0.0 | 0.0 | T | 3.1 | 31.3 | 68.4 | 175.6 | 50 |
| Least Snowfall Amount (inches) | 5.4 | 3.1 | T | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 4.3 | 30.8 | 50 |
| Maximum Snowfall in 24 hrs. (inches) | 18.3 | 18.4 | 15.1 | 6.4 | 7.9 | 0.0 | 0.0 | 0.0 | T | 2.8 | 19.0 | 33.9 | 19.0 | 50 |
| Mean Number of Days with Snow | 25 | 21 | 17 | 7 | 1 | 0 | 0 | 0 | Miss | 2 | 11 | 22 | 106 | 50 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.52 | 0.14 | 0.35 | 0.17 | 0.05 | 0.03 | 0.01 | 0.02 | 0.01 | 0.06 | 0.16 | 0.17 | 0.19 | 50 |
| Mean Wind Speed (Knots) | 12.1 | 11.5 | 11.1 | 10.7 | 9.7 | 9.3 | 8.9 | 8.2 | 8.6 | 9.4 | 10.7 | 11.2 | 10.1 | 50 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 2.8 | 3.4 | 3.4 | 3.8 | 3.9 | 3.8 | 3.6 | 4.5 | 4.2 | 3.8 | 2.9 | 2.9 | 3.6 | 50 |
| North Northeast | 2.6 | 2.8 | 3.1 | 3.1 | 3.9 | 3.4 | 2.8 | 3.4 | 3.6 | 3.2 | 2.2 | 2.3 | 3.0 | 50 |
| Northeast | 4.0 | 4.5 | 6.2 | 5.2 | 5.9 | 4.8 | 3.7 | 5.0 | 5.2 | 4.4 | 3.8 | 3.8 | 4.7 | 50 |
| East Northeast | 4.5 | 5.7 | 6.7 | 6.0 | 5.4 | 3.9 | 2.8 | 3.6 | 4.1 | 4.0 | 4.3 | 4.2 | 4.6 | 50 |
| East | 3.5 | 4.0 | 4.8 | 4.4 | 4.0 | 3.0 | 3.0 | 3.3 | 3.5 | 3.8 | 3.6 | 4.2 | 3.7 | 50 |
| East Southeast | 2.3 | 2.5 | 2.9 | 3.1 | 3.1 | 2.2 | 2.1 | 3.2 | 3.3 | 3.1 | 3.1 | 2.9 | 2.8 | 50 |
| Southeast | 2.9 | 3.1 | 3.5 | 3.7 | 3.9 | 4.0 | 4.0 | 5.7 | 6.2 | 5.8 | 4.6 | 3.8 | 4.3 | 50 |
| South Southeast | 3.7 | 3.4 | 4.0 | 4.2 | 4.5 | 5.1 | 4.9 | 6.0 | 7.0 | 6.2 | 5.8 | 5.0 | 5.0 | 50 |
| South | 6.9 | 6.1 | 5.6 | 6.0 | 7.8 | 9.3 | 9.8 | 10.1 | 10.8 | 10.8 | 9.4 | 7.9 | 8.4 | 50 |
| South Southwest | 9.1 | 8.4 | 7.0 | 8.4 | 9.4 | 11.2 | 10.9 | 9.9 | 9.9 | 9.8 | 10.0 | 10.4 | 9.5 | 50 |
| Southwest | 11.2 | 13.4 | 14.5 | 17.6 | 18.9 | 18.6 | 18.3 | 14.5 | 11.2 | 11.0 | 9.5 | 8.3 | 13.9 | 50 |
| West Southwest | 15.4 | 15.9 | 13.3 | 14.0 | 13.5 | 14.6 | 15.6 | 12.3 | 10.4 | 9.8 | 11.2 | 11.4 | 13.1 | 50 |
| West | 14.7 | 11.2 | 8.1 | 5.8 | 4.4 | 4.8 | 5.1 | 5.3 | 5.9 | 8.2 | 12.5 | 14.8 | 8.4 | 50 |
| West Northwest | 8.0 | 6.4 | 6.8 | 4.8 | 3.5 | 3.3 | 3.6 | 3.8 | 4.8 | 6.5 | 8.2 | 8.5 | 5.7 | 50 |
| Northwest | 4.5 | 4.4 | 5.2 | 4.9 | 3.4 | 3.3 | 4.2 | 4.1 | 4.6 | 4.3 | 4.7 | 4.2 | 4.3 | 50 |
| North Northwest | 2.8 | 3.5 | 3.7 | 3.7 | 3.3 | 3.2 | 3.8 | 3.6 | 3.6 | 3.8 | 3.3 | 3.7 | 3.5 | 50 |
| Calm | 1.1 | 1.5 | 1.4 | 1.5 | 1.5 | 1.7 | 2.1 | 2.2 | 1.9 | 1.6 | 1.0 | 1.4 | 1.6 | 50 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 8.3 | 8.6 | 7.7 | 8.0 | 7.9 | 7.6 | 6.8 | 7.1 | 7.1 | 7.4 | 6.9 | 7.8 | 7.6 | 50 |
| North Northeast | 8.6 | 9.3 | 8.4 | 8.9 | 8.2 | 7.5 | 7.9 | 7.7 | 7.6 | 7.5 | 7.6 | 8.5 | 8.1 | 50 |
| Northeast | 9.2 | 9.3 | 9.8 | 9.6 | 8.9 | 8.1 | 8.1 | 7.5 | 7.8 | 7.8 | 8.2 | 9.1 | 8.7 | 50 |
| East Northeast | 9.7 | 10.0 | 10.1 | 9.9 | 8.8 | 7.8 | 7.0 | 6.8 | 7.3 | 7.7 | 8.6 | 9.1 | 8.8 | 50 |
| East | 8.1 | 7.9 | 8.7 | 8.6 | 7.7 | 6.4 | 6.4 | 5.9 | 6.2 | 6.7 | 7.5 | 8.0 | 7.4 | 50 |
| East Southeast | 7.0 | 7.2 | 7.8 | 8.4 | 7.0 | 6.4 | 6.1 | 5.9 | 6.1 | 6.3 | 6.9 | 7.0 | 6.8 | 50 |
| Southeast | 7.7 | 8.1 | 8.6 | 8.6 | 7.7 | 7.0 | 6.3 | 6.2 | 6.8 | 7.1 | 7.8 | 7.5 | 7.3 | 50 |
| South Southeast | 8.6 | 9.1 | 9.7 | 9.4 | 7.8 | 7.2 | 6.4 | 6.4 | 7.1 | 7.7 | 8.8 | 8.4 | 7.9 | 50 |
| South | 10.2 | 8.7 | 9.4 | 8.6 | 7.9 | 7.1 | 6.8 | 6.6 | 7.9 | 8.3 | 9.7 | 9.9 | 8.3 | 50 |
| South Southwest | 12.4 | 11.1 | 10.9 | 10.2 | 9.1 | 9.0 | 8.6 | 8.2 | 9.6 | 10.3 | 11.9 | 12.5 | 10.3 | 50 |
| Southwest | 15.3 | 13.7 | 13.5 | 12.9 | 11.9 | 11.7 | 11.4 | 10.9 | 11.0 | 12.6 | 13.8 | 15.1 | 12.6 | 50 |
| West Southwest | 16.1 | 15.0 | 14.2 | 13.8 | 12.9 | 12.4 | 11.7 | 11.2 | 11.9 | 12.4 | 14.4 | 14.4 | 13.4 | 50 |
| West | 13.9 | 13.9 | 12.9 | 11.2 | 9.9 | 9.5 | 9.3 | 9.1 | 9.7 | 11.1 | 12.8 | 13.3 | 12.1 | 50 |
| West Northwest | 12.4 | 12.5 | 12.3 | 12.0 | 10.6 | 9.8 | 9.2 | 9.1 | 9.7 | 10.2 | 11.3 | 12.2 | 11.3 | 50 |
| Northwest | 11.1 | 11.0 | 11.3 | 11.7 | 10.6 | 10.1 | 9.3 | 8.9 | 9.7 | 10.2 | 10.6 | 11.7 | 10.6 | 50 |
| North Northwest | 9.9 | 10.1 | 9.8 | 9.8 | 9.2 | 9.1 | 8.7 | 8.0 | 8.5 | 9.1 | 9.7 | 10.0 | 9.3 | 50 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 12 | 12 | 14 | 13 | 14 | 13 | 13 | 15 | 13 | 13 | 13 | 13 | 158 | 50 |
| Percent Obs with Visibility <= 1/2 mile | 1.39 | 1.19 | 1.44 | 0.87 | 0.84 | 0.36 | 0.20 | 0.25 | 0.31 | 0.52 | 0.68 | 0.98 | 0.75 | 50 |

T-4

## CLIMATOLOGICAL TABLE

### ERIE, PA (42°06'N,080°11'W) Elevation 732 feet (223.1 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1018.4 | 1018.2 | 1016.4 | 1015.3 | 1015.6 | 1014.9 | 1016.0 | 1016.9 | 1018.1 | 1018.7 | 1017.2 | 1018.4 | 1017.0 | 48 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 26.4 | 26.7 | 34.9 | 45.9 | 56.3 | 66.2 | 70.8 | 69.5 | 63.1 | 52.8 | 42.3 | 31.7 | 49.1 | 43 |
| Mean Daily Maximum | 32.8 | 33.9 | 42.6 | 54.5 | 65.5 | 75.1 | 79.3 | 77.9 | 71.3 | 60.7 | 48.6 | 37.3 | 56.8 | 43 |
| Mean Daily Minimum | 19.6 | 19.0 | 26.7 | 36.8 | 46.7 | 56.7 | 61.8 | 60.7 | 54.3 | 44.5 | 35.6 | 25.5 | 40.8 | 43 |
| Extreme Highest | 69 | 66 | 81 | 89 | 90 | 100 | 99 | 94 | 93 | 88 | 81 | 75 | 100 | 43 |
| Extreme Lowest | -18 | -17 | -10 | 12 | 26 | 32 | 44 | 37 | 33 | 24 | 7 | -6 | -18 | 43 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 59.0 | 56.8 | 38.9 | 27.9 | 31.1 | 24.3 | 34.7 | 44.0 | 56.3 | 62.0 | 47.5 | 59.0 | 45.1 | 48 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 7.1 | 10.8 | 14.9 | 17.5 | 20.2 | 20.7 | 22.1 | 22.1 | 20.0 | 20.7 | 9.1 | 6.6 | 16.0 | 48 |
| Percent of time Scattered | 8.3 | 10.9 | 13.8 | 15.4 | 19.7 | 24.8 | 27.9 | 26.1 | 22.2 | 17.2 | 10.9 | 6.9 | 17.1 | 48 |
| Percent of time Broken | 12.0 | 13.9 | 14.2 | 17.1 | 19.8 | 22.5 | 23.0 | 22.1 | 23.4 | 19.6 | 15.5 | 11.3 | 17.9 | 48 |
| Percent of time Overcast | 72.6 | 64.5 | 57.1 | 50.0 | 40.4 | 32.0 | 27.0 | 29.8 | 34.3 | 42.5 | 64.5 | 75.1 | 49.0 | 48 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 2.47 | 2.25 | 3.06 | 3.34 | 3.37 | 3.79 | 3.33 | 3.87 | 4.08 | 3.62 | 3.99 | 3.37 | 40.52 | 43 |
| Greatest Amount (inches) | 5.48 | 5.73 | 6.78 | 7.11 | 7.82 | 7.71 | 7.70 | 11.06 | 10.65 | 9.87 | 10.40 | 6.94 | 61.70 | 43 |
| Least Amount (inches) | 0.87 | 0.57 | 0.63 | 1.63 | 1.00 | 0.75 | 0.65 | 1.04 | 1.33 | 0.40 | 1.52 | 1.38 | 28.11 | 43 |
| Maximum in 24 hrs. (inches) | 1.26 | 2.11 | 1.92 | 1.97 | 2.23 | 2.68 | 2.79 | 3.29 | 4.66 | 4.35 | 2.28 | 2.09 | 4.66 | 43 |
| Mean Number of Days with Precipitation | 26 | 22 | 22 | 19 | 16 | 15 | 13 | 14 | 14 | 16 | 21 | 25 | 223 | 42 |
| Mean Snowfall Amount (inches) | 22.2 | 16.1 | 10.6 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 9.7 | 21.9 | 83.1 | 43 |
| Greatest Snowfall Amount (inches) | 62.4 | 32.1 | 27.3 | 10.2 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 4.0 | 36.3 | 66.9 | 146.7 | 43 |
| Least Snowfall Amount (inches) | 6.0 | 4.6 | 0.7 | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 1.0 | 39.2 | 43 |
| Maximum Snowfall in 24 hrs. (inches) | 12.9 | 12.2 | 11.5 | 6.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 17.4 | 14.3 | 17.4 | 43 |
| Mean Number of Days with Snow | 22 | 19 | 14 | 5 | Miss | 0 | 0 | 0 | 0 | 2 | 10 | 19 | 91 | 42 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.06 | 0.07 | 0.08 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.05 | 48 |
| Mean Wind Speed (Knots) | 11.4 | 10.4 | 10.4 | 9.9 | 8.8 | 8.3 | 7.8 | 7.7 | 8.6 | 9.7 | 11.3 | 11.5 | 9.6 | 48 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 2.7 | 3.4 | 3.5 | 3.6 | 4.2 | 4.2 | 4.8 | 5.1 | 4.8 | 4.7 | 2.9 | 3.1 | 3.9 | 48 |
| North Northeast | 2.5 | 3.8 | 4.7 | 4.3 | 4.9 | 4.0 | 4.1 | 4.6 | 4.7 | 3.3 | 2.3 | 2.1 | 3.8 | 48 |
| Northeast | 4.0 | 6.6 | 8.8 | 7.3 | 7.9 | 5.7 | 4.0 | 4.8 | 4.3 | 4.1 | 2.8 | 2.6 | 5.2 | 48 |
| East Northeast | 3.7 | 4.5 | 5.6 | 4.8 | 4.3 | 2.8 | 2.5 | 2.9 | 3.2 | 3.2 | 2.8 | 3.5 | 3.6 | 48 |
| East | 1.4 | 1.9 | 1.7 | 2.1 | 1.8 | 1.3 | 1.4 | 1.7 | 2.2 | 2.0 | 2.0 | 1.9 | 1.8 | 48 |
| East Southeast | 1.2 | 1.1 | 1.6 | 1.5 | 1.2 | 1.1 | 1.2 | 1.6 | 1.9 | 1.6 | 1.5 | 1.2 | 1.4 | 48 |
| Southeast | 2.4 | 2.5 | 2.7 | 3.2 | 2.7 | 2.2 | 2.0 | 2.3 | 3.2 | 2.8 | 3.1 | 2.8 | 2.7 | 48 |
| South Southeast | 7.3 | 6.6 | 8.1 | 7.6 | 7.5 | 7.4 | 6.8 | 7.9 | 11.2 | 11.3 | 10.4 | 9.5 | 8.5 | 48 |
| South | 12.0 | 11.3 | 9.9 | 10.6 | 13.6 | 16.5 | 17.9 | 18.6 | 19.1 | 19.2 | 15.5 | 14.0 | 14.9 | 48 |
| South Southwest | 13.5 | 9.7 | 7.4 | 8.1 | 8.9 | 11.7 | 12.3 | 11.9 | 12.1 | 13.1 | 15.2 | 15.4 | 11.6 | 48 |
| Southwest | 11.9 | 8.7 | 6.4 | 6.8 | 6.2 | 7.3 | 7.1 | 7.0 | 6.0 | 7.6 | 11.1 | 12.0 | 8.2 | 48 |
| West Southwest | 11.0 | 11.5 | 11.2 | 11.2 | 9.5 | 8.3 | 7.1 | 5.4 | 4.1 | 4.3 | 6.3 | 7.2 | 8.1 | 48 |
| West | 9.1 | 9.5 | 8.9 | 9.3 | 8.2 | 7.6 | 7.2 | 5.8 | 4.6 | 4.7 | 5.8 | 6.6 | 7.3 | 48 |
| West Northwest | 8.2 | 7.5 | 8.0 | 7.6 | 5.9 | 6.7 | 7.1 | 6.1 | 5.7 | 5.4 | 6.8 | 8.1 | 6.9 | 48 |
| Northwest | 3.8 | 4.3 | 4.5 | 4.7 | 4.2 | 4.3 | 5.1 | 4.9 | 4.6 | 4.2 | 4.8 | 4.1 | 4.5 | 48 |
| North Northwest | 2.9 | 3.3 | 3.2 | 3.5 | 3.7 | 3.9 | 4.4 | 4.9 | 3.9 | 4.7 | 4.4 | 3.9 | 3.9 | 48 |
| Calm | 2.7 | 3.8 | 3.8 | 4.0 | 5.4 | 5.2 | 5.1 | 4.8 | 4.5 | 3.7 | 2.5 | 2.0 | 4.0 | 48 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 8.3 | 8.0 | 7.9 | 7.6 | 7.4 | 7.1 | 7.7 | 7.9 | 8.3 | 9.0 | 8.9 | 9.7 | 8.1 | 48 |
| North Northeast | 10.4 | 9.7 | 10.4 | 9.8 | 9.4 | 9.0 | 9.1 | 9.4 | 9.5 | 9.6 | 9.9 | 10.1 | 9.7 | 48 |
| Northeast | 10.7 | 11.0 | 11.1 | 11.1 | 10.6 | 10.5 | 9.6 | 9.6 | 10.2 | 10.2 | 10.7 | 10.3 | 10.6 | 48 |
| East Northeast | 9.5 | 9.3 | 8.9 | 8.7 | 8.2 | 8.1 | 7.7 | 7.6 | 7.8 | 8.4 | 9.7 | 9.2 | 8.6 | 48 |
| East | 5.7 | 6.0 | 6.0 | 6.3 | 5.3 | 5.6 | 5.2 | 5.0 | 5.3 | 5.5 | 5.8 | 6.1 | 5.7 | 48 |
| East Southeast | 6.4 | 7.0 | 8.0 | 7.9 | 6.8 | 5.6 | 5.9 | 5.5 | 6.0 | 5.5 | 7.3 | 6.6 | 6.5 | 48 |
| Southeast | 10.2 | 11.8 | 11.8 | 11.8 | 9.9 | 8.2 | 7.3 | 7.6 | 8.0 | 9.5 | 10.7 | 10.2 | 9.8 | 48 |
| South Southeast | 13.0 | 12.8 | 13.4 | 12.3 | 10.9 | 9.3 | 8.5 | 8.7 | 9.8 | 11.1 | 12.5 | 12.7 | 11.3 | 48 |
| South | 11.5 | 10.7 | 10.6 | 9.5 | 8.4 | 8.2 | 7.2 | 7.3 | 8.4 | 9.4 | 11.1 | 11.6 | 9.3 | 48 |
| South Southwest | 12.3 | 11.6 | 11.6 | 10.4 | 9.3 | 8.8 | 8.1 | 7.5 | 8.9 | 10.5 | 11.9 | 12.5 | 10.3 | 48 |
| Southwest | 12.0 | 10.7 | 10.6 | 9.8 | 9.1 | 8.9 | 8.3 | 8.3 | 9.4 | 10.8 | 12.1 | 12.0 | 10.5 | 48 |
| West Southwest | 12.6 | 11.8 | 11.6 | 11.6 | 10.6 | 10.2 | 9.1 | 8.6 | 10.0 | 11.1 | 12.2 | 12.2 | 11.2 | 48 |
| West | 12.4 | 11.4 | 11.4 | 11.4 | 10.0 | 9.4 | 9.3 | 9.0 | 9.7 | 10.9 | 12.3 | 12.7 | 10.9 | 48 |
| West Northwest | 12.4 | 11.4 | 11.2 | 10.7 | 9.1 | 8.8 | 9.0 | 9.0 | 10.0 | 11.7 | 13.0 | 13.1 | 10.9 | 48 |
| Northwest | 11.8 | 10.0 | 10.4 | 9.9 | 8.2 | 8.2 | 8.4 | 8.6 | 9.8 | 11.7 | 13.1 | 12.8 | 10.2 | 48 |
| North Northwest | 10.5 | 8.9 | 9.3 | 9.0 | 7.7 | 7.4 | 8.2 | 8.2 | 9.3 | 10.7 | 11.8 | 11.7 | 9.4 | 48 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 12 | 12 | 14 | 12 | 12 | 11 | 10 | 11 | 11 | 10 | 12 | 13 | 140 | 42 |
| Percent Obs with Visibility <= 1/2 mile | 0.93 | 1.06 | 1.60 | 0.80 | 0.61 | 0.30 | 0.08 | 0.09 | 0.11 | 0.16 | 0.49 | 0.82 | 0.59 | 48 |

# CLIMATOLOGICAL TABLE

## CLEVELAND, OH (41°26'N,081°52'W) Elevation 770 feet (234.7 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1019.1 | 1018.8 | 1016.7 | 1015.7 | 1015.9 | 1015.3 | 1016.4 | 1017.3 | 1018.5 | 1019.1 | 1018.1 | 1019.2 | 1017.5 | 48 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 26.6 | 28.5 | 37.3 | 48.7 | 59.1 | 68.4 | 72.8 | 71.2 | 64.4 | 53.7 | 42.5 | 31.5 | 50.5 | 48 |
| Mean Daily Maximum | 33.5 | 36.0 | 45.6 | 58.4 | 69.4 | 78.7 | 82.7 | 81.0 | 74.1 | 63.0 | 49.9 | 37.9 | 59.3 | 48 |
| Mean Daily Minimum | 19.1 | 20.5 | 28.5 | 38.5 | 48.3 | 57.7 | 62.3 | 61.0 | 54.2 | 43.9 | 34.7 | 24.6 | 41.2 | 48 |
| Extreme Highest | 73 | 69 | 82 | 88 | 92 | 104 | 100 | 102 | 101 | 89 | 82 | 77 | 104 | 48 |
| Extreme Lowest | -20 | -15 | -5 | 10 | 25 | 31 | 41 | 38 | 34 | 19 | 3 | -15 | -20 | 48 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 66.1 | 63.5 | 41.5 | 31.6 | 34.4 | 28.4 | 39.0 | 48.1 | 60.2 | 65.7 | 55.7 | 67.3 | 50.1 | 48 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 9.8 | 12.5 | 15.0 | 17.8 | 19.6 | 19.3 | 21.4 | 21.8 | 22.7 | 23.1 | 11.9 | 9.8 | 17.1 | 48 |
| Percent of time Scattered | 9.9 | 11.0 | 12.4 | 15.3 | 19.7 | 24.0 | 27.2 | 27.2 | 22.0 | 16.9 | 11.7 | 9.0 | 17.2 | 48 |
| Percent of time Broken | 12.1 | 13.6 | 14.8 | 16.3 | 19.5 | 22.5 | 23.4 | 22.1 | 21.1 | 18.5 | 14.0 | 12.2 | 17.5 | 48 |
| Percent of time Overcast | 68.3 | 62.9 | 57.7 | 50.6 | 41.2 | 34.1 | 28.0 | 28.8 | 34.3 | 41.5 | 62.4 | 68.9 | 48.1 | 48 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 2.57 | 2.27 | 3.05 | 3.41 | 3.46 | 3.51 | 3.57 | 3.41 | 3.19 | 2.58 | 3.24 | 2.90 | 37.16 | 48 |
| Greatest Amount (inches) | 7.01 | 4.70 | 6.07 | 6.61 | 9.14 | 9.06 | 9.12 | 8.96 | 7.33 | 9.50 | 8.80 | 8.59 | 53.83 | 48 |
| Least Amount (inches) | 0.36 | 0.48 | 0.78 | 1.24 | 1.00 | 0.65 | 1.21 | 0.53 | 0.74 | 0.61 | 0.80 | 0.71 | 18.78 | 48 |
| Maximum in 24 hrs. (inches) | 2.53 | 2.04 | 2.76 | 2.10 | 3.36 | 2.97 | 2.71 | 3.55 | 2.30 | 3.36 | 2.23 | 2.39 | 3.55 | 48 |
| Mean Number of Days with Precipitation | 25 | 21 | 22 | 19 | 17 | 15 | 14 | 14 | 14 | 15 | 20 | 24 | 220 | 48 |
| Mean Snowfall Amount (inches) | 13.5 | 12.2 | 10.6 | 2.3 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 5.3 | 12.0 | 56.5 | 48 |
| Greatest Snowfall Amount (inches) | 42.8 | 39.1 | 26.3 | 13.2 | 2.1 | 0.0 | 0.0 | 0.0 | 0.0 | 8.0 | 22.3 | 30.3 | 96.5 | 48 |
| Least Snowfall Amount (inches) | 2.0 | 3.1 | 1.2 | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 1.0 | 24.5 | 48 |
| Maximum Snowfall in 24 hrs. (inches) | 10.4 | 13.6 | 10.8 | 8.6 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.7 | 12.8 | 12.0 | 13.6 | 48 |
| Mean Number of Days with Snow | 21 | 17 | 14 | 5 | Miss | 0 | 0 | 0 | 0 | 1 | 9 | 17 | 84 | 48 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.06 | 0.01 | 0.08 | 0.06 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.02 | 0.02 | 48 |
| Mean Wind Speed (Knots) | 10.7 | 10.1 | 10.5 | 9.9 | 8.7 | 8.1 | 7.5 | 7.2 | 7.7 | 8.7 | 10.3 | 10.5 | 9.1 | 48 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 3.7 | 6.5 | 7.4 | 8.7 | 10.2 | 9.6 | 10.0 | 9.5 | 7.2 | 4.9 | 3.3 | 3.3 | 7.0 | 48 |
| North Northeast | 3.3 | 6.2 | 8.0 | 7.5 | 9.4 | 8.2 | 7.0 | 7.4 | 5.8 | 3.8 | 2.4 | 2.2 | 5.9 | 48 |
| Northeast | 2.6 | 4.3 | 5.6 | 4.9 | 5.7 | 4.0 | 3.7 | 3.8 | 3.5 | 3.1 | 2.0 | 2.1 | 3.8 | 48 |
| East Northeast | 2.0 | 2.0 | 2.8 | 2.2 | 2.4 | 1.8 | 1.6 | 2.2 | 2.3 | 2.2 | 1.8 | 1.8 | 2.1 | 48 |
| East | 1.4 | 1.8 | 2.1 | 2.2 | 1.9 | 1.7 | 1.7 | 1.7 | 2.5 | 2.2 | 1.5 | 1.7 | 1.9 | 48 |
| East Southeast | 2.0 | 2.5 | 3.0 | 3.0 | 2.4 | 1.9 | 1.7 | 1.9 | 2.6 | 2.4 | 2.2 | 2.5 | 2.3 | 48 |
| Southeast | 2.6 | 3.3 | 3.9 | 3.8 | 3.8 | 3.0 | 3.0 | 3.2 | 4.1 | 4.2 | 3.7 | 3.7 | 3.5 | 48 |
| South Southeast | 5.5 | 5.2 | 5.5 | 6.2 | 6.1 | 6.4 | 5.8 | 6.0 | 7.7 | 8.3 | 7.2 | 6.2 | 6.4 | 48 |
| South | 11.1 | 9.6 | 8.6 | 10.0 | 10.1 | 12.1 | 11.2 | 11.5 | 13.4 | 13.8 | 14.1 | 13.3 | 11.6 | 48 |
| South Southwest | 12.8 | 10.1 | 8.9 | 9.2 | 9.8 | 12.8 | 13.1 | 12.7 | 13.0 | 14.3 | 13.9 | 13.3 | 12.0 | 48 |
| Southwest | 15.7 | 12.5 | 8.9 | 9.8 | 10.2 | 12.8 | 14.7 | 14.2 | 12.7 | 13.7 | 15.3 | 14.7 | 13.0 | 48 |
| West Southwest | 13.4 | 10.2 | 8.2 | 7.2 | 6.7 | 6.2 | 6.6 | 6.2 | 6.0 | 7.9 | 13.5 | 14.2 | 8.8 | 48 |
| West | 7.0 | 6.5 | 6.7 | 5.4 | 4.1 | 3.5 | 3.5 | 3.1 | 3.5 | 4.0 | 5.3 | 6.5 | 4.9 | 48 |
| West Northwest | 7.1 | 7.3 | 7.5 | 6.6 | 4.8 | 4.0 | 4.3 | 3.6 | 4.2 | 4.6 | 5.7 | 6.5 | 5.5 | 48 |
| Northwest | 5.0 | 5.6 | 6.2 | 5.4 | 4.1 | 3.8 | 3.6 | 3.9 | 3.8 | 4.2 | 4.5 | 4.4 | 4.5 | 48 |
| North Northwest | 3.7 | 4.6 | 4.7 | 5.5 | 5.2 | 4.8 | 4.8 | 4.6 | 3.9 | 3.6 | 2.8 | 2.6 | 4.2 | 48 |
| Calm | 1.4 | 2.1 | 1.8 | 2.6 | 3.5 | 3.7 | 4.1 | 4.8 | 4.3 | 3.3 | 1.3 | 1.3 | 2.8 | 48 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 8.3 | 8.7 | 8.8 | 8.6 | 8.3 | 8.0 | 8.0 | 8.0 | 8.1 | 8.4 | 8.3 | 8.9 | 8.3 | 48 |
| North Northeast | 9.2 | 9.7 | 9.7 | 9.2 | 9.1 | 8.7 | 8.3 | 8.4 | 8.3 | 8.6 | 9.3 | 9.5 | 9.0 | 48 |
| Northeast | 10.3 | 10.0 | 10.2 | 9.6 | 8.7 | 8.6 | 7.9 | 7.9 | 8.5 | 8.4 | 9.5 | 9.8 | 9.1 | 48 |
| East Northeast | 8.9 | 8.4 | 8.6 | 8.1 | 7.3 | 7.0 | 7.5 | 6.8 | 7.0 | 8.0 | 8.6 | 8.6 | 7.9 | 48 |
| East | 7.8 | 7.5 | 8.2 | 8.6 | 6.6 | 6.3 | 6.1 | 5.4 | 6.5 | 6.3 | 7.9 | 7.7 | 7.1 | 48 |
| East Southeast | 8.4 | 8.6 | 9.5 | 9.5 | 7.3 | 7.0 | 7.0 | 6.7 | 6.9 | 7.2 | 8.2 | 8.9 | 8.0 | 48 |
| Southeast | 8.5 | 8.6 | 9.3 | 8.8 | 7.4 | 6.2 | 5.8 | 5.7 | 6.1 | 7.0 | 8.0 | 8.0 | 7.5 | 48 |
| South Southeast | 9.1 | 8.9 | 9.8 | 9.1 | 8.1 | 6.8 | 6.2 | 6.4 | 6.9 | 7.9 | 9.4 | 9.3 | 8.1 | 48 |
| South | 10.9 | 10.2 | 10.7 | 10.5 | 9.3 | 8.3 | 7.5 | 7.1 | 8.2 | 9.1 | 10.9 | 10.9 | 9.4 | 48 |
| South Southwest | 11.0 | 10.7 | 11.2 | 10.5 | 9.5 | 8.7 | 8.0 | 7.2 | 8.1 | 9.2 | 10.4 | 10.9 | 9.5 | 48 |
| Southwest | 11.2 | 10.8 | 11.6 | 11.0 | 9.3 | 8.7 | 7.8 | 7.3 | 8.1 | 9.1 | 10.6 | 10.7 | 9.6 | 48 |
| West Southwest | 12.3 | 11.6 | 12.7 | 12.3 | 10.0 | 9.0 | 8.5 | 8.1 | 8.4 | 9.8 | 11.7 | 11.7 | 10.9 | 48 |
| West | 11.7 | 11.8 | 12.2 | 11.6 | 9.7 | 9.3 | 8.2 | 7.9 | 8.4 | 9.6 | 11.1 | 11.2 | 10.6 | 48 |
| West Northwest | 11.6 | 11.8 | 11.7 | 11.5 | 10.6 | 9.5 | 9.3 | 8.6 | 9.6 | 10.2 | 11.1 | 11.4 | 10.8 | 48 |
| Northwest | 11.4 | 10.8 | 11.1 | 10.7 | 9.5 | 9.2 | 8.7 | 8.5 | 9.5 | 10.6 | 11.2 | 11.5 | 10.4 | 48 |
| North Northwest | 10.6 | 10.3 | 10.0 | 9.9 | 8.5 | 8.8 | 8.0 | 8.1 | 9.1 | 9.5 | 10.4 | 11.0 | 9.4 | 48 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 13 | 12 | 13 | 12 | 13 | 11 | 12 | 14 | 12 | 11 | 12 | 13 | 148 | 48 |
| Percent Obs with Visibility <= 1/2 mile | 0.76 | 1.08 | 1.27 | 0.42 | 0.46 | 0.20 | 0.15 | 0.34 | 0.18 | 0.28 | 0.30 | 0.60 | 0.50 | 48 |

## CLIMATOLOGICAL TABLE

### TOLEDO, OH (41°35'N,083°48'W) Elevation 669 feet (203.9 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1019.3 | 1018.7 | 1016.6 | 1015.2 | 1015.7 | 1015.1 | 1016.0 | 1017.1 | 1018.4 | 1018.8 | 1018.0 | 1019.4 | 1017.4 | 41 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 23.3 | 26.1 | 36.3 | 48.3 | 59.2 | 68.3 | 72.7 | 70.7 | 63.3 | 51.8 | 40.1 | 28.6 | 49.2 | 41 |
| Mean Daily Maximum | 30.6 | 33.9 | 45.3 | 59.1 | 70.8 | 79.8 | 83.7 | 81.9 | 74.6 | 62.8 | 48.3 | 35.6 | 59.0 | 41 |
| Mean Daily Minimum | 15.6 | 17.8 | 26.7 | 37.0 | 47.1 | 56.3 | 61.1 | 59.1 | 51.5 | 40.4 | 31.5 | 21.1 | 38.9 | 41 |
| Extreme Highest | 65 | 68 | 80 | 88 | 95 | 104 | 104 | 99 | 98 | 91 | 78 | 68 | 104 | 41 |
| Extreme Lowest | -20 | -14 | -6 | 8 | 25 | 32 | 40 | 34 | 26 | 15 | 2 | -19 | -20 | 41 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 68.1 | 61.7 | 40.7 | 27.1 | 31.9 | 25.7 | 34.5 | 45.5 | 58.9 | 62.8 | 55.3 | 69.1 | 48.5 | 41 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 16.4 | 16.5 | 19.3 | 20.8 | 21.4 | 20.9 | 23.0 | 23.1 | 26.3 | 27.7 | 16.7 | 14.4 | 20.6 | 40 |
| Percent of time Scattered | 12.6 | 13.3 | 13.8 | 15.9 | 19.8 | 25.2 | 29.7 | 28.1 | 22.1 | 17.5 | 12.7 | 11.2 | 18.5 | 40 |
| Percent of time Broken | 13.4 | 15.8 | 15.2 | 19.0 | 22.2 | 25.3 | 24.3 | 23.4 | 21.5 | 18.4 | 16.7 | 13.3 | 19.1 | 40 |
| Percent of time Overcast | 57.7 | 54.4 | 51.7 | 44.4 | 36.6 | 28.6 | 23.0 | 25.4 | 30.1 | 36.3 | 54.0 | 61.1 | 41.8 | 40 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 1.88 | 1.73 | 2.51 | 3.08 | 2.88 | 3.62 | 3.17 | 3.22 | 2.65 | 2.19 | 2.78 | 2.65 | 32.36 | 41 |
| Greatest Amount (inches) | 4.61 | 5.39 | 5.70 | 6.10 | 5.13 | 8.48 | 6.75 | 8.47 | 8.10 | 5.53 | 6.86 | 6.81 | 40.85 | 41 |
| Least Amount (inches) | 0.27 | 0.27 | 0.58 | 0.88 | 0.96 | 0.27 | 0.34 | 0.40 | 0.58 | 0.28 | 0.55 | 0.54 | 22.04 | 41 |
| Maximum in 24 hrs. (inches) | 1.53 | 2.59 | 2.60 | 2.89 | 1.69 | 3.12 | 4.34 | 2.42 | 3.33 | 2.88 | 2.71 | 3.53 | 4.34 | 41 |
| Mean Number of Days with Precipitation | 23 | 19 | 20 | 18 | 16 | 14 | 14 | 13 | 13 | 14 | 18 | 23 | 205 | 41 |
| Mean Snowfall Amount (inches) | 9.6 | 8.2 | 6.1 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | T | 0.1 | 2.9 | 8.2 | 36.8 | 41 |
| Greatest Snowfall Amount (inches) | 30.8 | 16.6 | 17.7 | 12.0 | 1.3 | 0.0 | 0.0 | 0.0 | T | 2.0 | 17.9 | 24.2 | 72.3 | 41 |
| Least Snowfall Amount (inches) | 0.7 | 0.5 | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 0.9 | 19.3 | 41 |
| Maximum Snowfall in 24 hrs. (inches) | 10.2 | 7.7 | 9.4 | 6.5 | 0.8 | 0.0 | 0.0 | 0.0 | T | 1.8 | 7.1 | 13.9 | 10.2 | 41 |
| Mean Number of Days with Snow | 20 | 16 | 12 | 4 | Miss | 0 | 0 | 0 | Miss | 1 | 8 | 17 | 78 | 41 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.01 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.30 | 40 |
| Mean Wind Speed (Knots) | 9.6 | 9.3 | 9.7 | 9.6 | 8.4 | 7.3 | 6.5 | 6.2 | 6.7 | 7.8 | 9.0 | 9.1 | 8.2 | 40 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 3.9 | 5.0 | 5.0 | 4.6 | 4.9 | 4.9 | 5.0 | 5.9 | 5.9 | 4.4 | 3.6 | 3.9 | 4.7 | 40 |
| North Northeast | 2.2 | 3.0 | 3.6 | 2.8 | 3.4 | 3.6 | 3.5 | 4.2 | 3.7 | 2.8 | 2.1 | 2.0 | 3.1 | 40 |
| Northeast | 3.0 | 4.5 | 4.4 | 4.3 | 4.9 | 4.5 | 3.8 | 3.8 | 3.5 | 2.7 | 2.5 | 2.7 | 3.7 | 40 |
| East Northeast | 4.1 | 7.7 | 10.7 | 9.3 | 9.6 | 7.3 | 5.2 | 4.7 | 5.2 | 4.8 | 3.7 | 3.8 | 6.3 | 40 |
| East | 3.5 | 4.3 | 6.8 | 7.0 | 7.1 | 5.4 | 4.5 | 3.8 | 4.9 | 3.9 | 3.4 | 4.1 | 4.9 | 40 |
| East Southeast | 2.5 | 2.7 | 3.5 | 3.7 | 4.2 | 3.5 | 2.9 | 3.3 | 3.8 | 2.8 | 2.9 | 3.1 | 3.2 | 40 |
| Southeast | 2.2 | 2.3 | 2.0 | 3.1 | 3.1 | 2.5 | 2.6 | 2.6 | 3.0 | 3.6 | 2.8 | 2.8 | 2.7 | 40 |
| South Southeast | 3.0 | 2.6 | 3.5 | 4.1 | 3.5 | 3.2 | 3.4 | 3.6 | 4.4 | 5.2 | 4.6 | 3.8 | 3.8 | 40 |
| South | 6.3 | 5.6 | 5.8 | 5.8 | 5.9 | 7.3 | 7.0 | 6.8 | 7.7 | 8.5 | 8.2 | 7.0 | 6.8 | 40 |
| South Southwest | 8.4 | 7.2 | 6.2 | 6.7 | 6.7 | 9.5 | 9.0 | 8.5 | 8.0 | 9.2 | 10.0 | 8.9 | 8.2 | 40 |
| Southwest | 14.0 | 10.3 | 7.8 | 9.0 | 9.3 | 11.5 | 11.9 | 11.6 | 10.3 | 12.0 | 13.4 | 14.7 | 11.3 | 40 |
| West Southwest | 19.2 | 13.9 | 9.8 | 9.7 | 9.6 | 9.9 | 11.2 | 10.9 | 8.7 | 10.4 | 15.0 | 15.9 | 12.0 | 40 |
| West | 9.7 | 9.0 | 8.5 | 7.6 | 6.1 | 6.7 | 6.8 | 6.3 | 5.9 | 6.8 | 8.6 | 8.6 | 7.5 | 40 |
| West Northwest | 6.8 | 7.5 | 8.9 | 7.8 | 7.0 | 5.9 | 6.0 | 5.5 | 6.3 | 6.8 | 6.6 | 6.5 | 6.8 | 40 |
| Northwest | 4.7 | 6.5 | 5.6 | 5.8 | 4.9 | 4.2 | 4.4 | 4.1 | 4.4 | 4.7 | 5.0 | 4.9 | 4.9 | 40 |
| North Northwest | 4.2 | 5.2 | 4.8 | 4.9 | 4.7 | 3.9 | 4.4 | 4.6 | 5.2 | 4.6 | 3.8 | 4.2 | 4.5 | 40 |
| Calm | 2.7 | 3.3 | 3.1 | 3.4 | 5.2 | 6.0 | 8.5 | 9.6 | 8.8 | 6.6 | 4.2 | 3.4 | 5.4 | 40 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 8.1 | 8.4 | 8.3 | 8.8 | 8.1 | 7.1 | 6.2 | 6.6 | 6.8 | 7.5 | 7.4 | 7.8 | 7.5 | 40 |
| North Northeast | 8.0 | 8.7 | 8.9 | 8.7 | 8.3 | 7.5 | 6.7 | 6.5 | 6.8 | 7.3 | 7.9 | 7.9 | 7.7 | 40 |
| Northeast | 10.7 | 10.2 | 10.0 | 9.8 | 8.8 | 7.6 | 7.6 | 7.5 | 7.6 | 8.3 | 8.9 | 9.1 | 8.8 | 40 |
| East Northeast | 9.6 | 9.8 | 10.3 | 9.7 | 8.8 | 7.8 | 6.9 | 7.1 | 7.3 | 7.8 | 7.9 | 8.5 | 8.7 | 40 |
| East | 7.6 | 7.4 | 8.6 | 9.0 | 7.9 | 7.2 | 6.6 | 6.1 | 6.5 | 6.8 | 7.4 | 7.6 | 7.5 | 40 |
| East Southeast | 7.3 | 7.3 | 7.8 | 7.8 | 7.3 | 6.6 | 6.2 | 6.2 | 6.1 | 6.4 | 7.2 | 7.4 | 7.0 | 40 |
| Southeast | 8.1 | 7.9 | 8.3 | 8.2 | 7.6 | 6.6 | 5.6 | 6.0 | 5.8 | 6.8 | 7.7 | 7.3 | 7.1 | 40 |
| South Southeast | 8.6 | 8.4 | 8.9 | 8.8 | 7.9 | 7.0 | 5.9 | 5.7 | 6.4 | 7.5 | 8.4 | 7.9 | 7.6 | 40 |
| South | 8.0 | 7.7 | 8.4 | 8.5 | 7.6 | 6.7 | 5.8 | 6.0 | 6.4 | 7.5 | 8.4 | 7.4 | 7.3 | 40 |
| South Southwest | 8.8 | 8.8 | 10.0 | 9.9 | 8.8 | 7.4 | 6.9 | 6.6 | 7.5 | 8.6 | 9.3 | 9.2 | 8.4 | 40 |
| Southwest | 10.1 | 9.9 | 11.2 | 10.9 | 9.7 | 8.1 | 7.4 | 7.1 | 8.0 | 9.1 | 10.1 | 9.8 | 9.2 | 40 |
| West Southwest | 11.3 | 10.8 | 10.9 | 11.0 | 10.0 | 8.3 | 7.6 | 7.1 | 7.6 | 9.3 | 10.9 | 11.0 | 9.9 | 40 |
| West | 11.1 | 10.5 | 10.9 | 11.3 | 9.7 | 8.6 | 7.7 | 7.0 | 7.8 | 9.2 | 10.4 | 10.6 | 9.7 | 40 |
| West Northwest | 10.7 | 10.8 | 11.4 | 11.4 | 9.8 | 9.7 | 8.4 | 7.9 | 8.7 | 9.5 | 10.3 | 10.2 | 10.0 | 40 |
| Northwest | 10.7 | 10.5 | 11.1 | 10.7 | 9.9 | 9.7 | 8.7 | 8.2 | 8.8 | 9.4 | 10.6 | 10.2 | 10.0 | 40 |
| North Northwest | 9.7 | 9.6 | 9.9 | 10.2 | 8.6 | 8.3 | 7.6 | 7.1 | 7.8 | 8.5 | 9.3 | 9.7 | 8.9 | 40 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 13 | 11 | 14 | 12 | 12 | 11 | 14 | 18 | 15 | 13 | 14 | 15 | 162 | 41 |
| Percent Obs with Visibility <= 1/2 mile | 1.16 | 1.22 | 0.90 | 0.32 | 0.22 | 0.36 | 0.34 | 0.59 | 0.69 | 0.91 | 0.85 | 1.50 | 0.76 | 40 |

# CLIMATOLOGICAL TABLE

## DETROIT, MI (42°14'N,083°20'W) Elevation 633 feet (192.9 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1018.5 | 1018.4 | 1016.5 | 1015.1 | 1015.1 | 1014.9 | 1015.6 | 1016.7 | 1017.9 | 1017.7 | 1017.5 | 1018.6 | 1016.9 | 37 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 23.6 | 25.9 | 35.9 | 47.8 | 59.0 | 68.1 | 72.7 | 71.1 | 63.6 | 51.7 | 40.3 | 29.0 | 49.2 | 37 |
| Mean Daily Maximum | 30.6 | 33.4 | 44.4 | 57.8 | 69.9 | 79.1 | 83.3 | 81.4 | 73.9 | 61.7 | 47.9 | 35.3 | 58.3 | 37 |
| Mean Daily Minimum | 16.1 | 17.9 | 26.9 | 37.2 | 47.5 | 56.7 | 61.6 | 60.2 | 52.7 | 41.3 | 32.3 | 22.0 | 39.5 | 37 |
| Extreme Highest | 62 | 65 | 81 | 89 | 93 | 104 | 102 | 100 | 98 | 91 | 77 | 68 | 104 | 37 |
| Extreme Lowest | -21 | -15 | -4 | 10 | 25 | 36 | 41 | 38 | 29 | 17 | 9 | -10 | -21 | 37 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 59.8 | 58.9 | 40.1 | 25.6 | 25.9 | 24.2 | 30.8 | 41.5 | 53.9 | 51.9 | 50.3 | 61.5 | 43.7 | 37 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 14.0 | 17.1 | 19.0 | 19.8 | 20.1 | 21.8 | 23.7 | 23.2 | 25.9 | 25.4 | 15.8 | 12.8 | 19.9 | 37 |
| Percent of time Scattered | 12.8 | 14.1 | 14.2 | 15.9 | 21.1 | 26.5 | 30.4 | 26.0 | 22.1 | 18.1 | 13.2 | 12.0 | 18.8 | 37 |
| Percent of time Broken | 14.6 | 16.7 | 16.1 | 17.9 | 20.8 | 23.4 | 23.0 | 22.9 | 20.4 | 18.5 | 16.6 | 13.6 | 18.7 | 37 |
| Percent of time Overcast | 58.6 | 52.0 | 50.7 | 46.4 | 38.1 | 28.3 | 22.9 | 27.9 | 31.7 | 38.0 | 54.5 | 61.6 | 42.6 | 37 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 1.91 | 1.68 | 2.44 | 3.04 | 2.89 | 3.59 | 3.12 | 3.39 | 2.82 | 2.23 | 2.66 | 2.54 | 32.32 | 37 |
| Greatest Amount (inches) | 3.92 | 5.02 | 4.48 | 5.40 | 6.20 | 7.04 | 6.02 | 7.83 | 7.52 | 4.87 | 5.68 | 6.00 | 42.64 | 37 |
| Least Amount (inches) | 0.27 | 0.15 | 0.82 | 0.92 | 0.87 | 0.97 | 0.59 | 0.72 | 0.43 | 0.35 | 0.79 | 0.46 | 21.01 | 37 |
| Maximum in 24 hrs. (inches) | 1.59 | 2.28 | 1.69 | 1.97 | 2.56 | 2.24 | 3.19 | 3.21 | 2.73 | 2.11 | 1.59 | 2.67 | 3.21 | 37 |
| Mean Number of Days with Precipitation | 23 | 19 | 20 | 17 | 15 | 14 | 13 | 13 | 13 | 14 | 18 | 22 | 201 | 37 |
| Mean Snowfall Amount (inches) | 10.5 | 9.2 | 6.7 | 1.7 | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 2.9 | 9.9 | 41.0 | 37 |
| Greatest Snowfall Amount (inches) | 29.6 | 20.8 | 15.7 | 9.0 | T | 0.0 | 0.0 | 0.0 | 0.0 | 2.9 | 11.8 | 34.9 | 75.3 | 37 |
| Least Snowfall Amount (inches) | 1.5 | 2.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 1.4 | 21.1 | 37 |
| Maximum Snowfall in 24 hrs. (inches) | 11.1 | 8.1 | 8.4 | 5.0 | T | 0.0 | 0.0 | 0.0 | 0.0 | 2.7 | 5.6 | 18.4 | 11.1 | 37 |
| Mean Number of Days with Snow | 21 | 17 | 13 | 4 | Miss | 0 | 0 | 0 | 0 | 1 | 8 | 18 | 82 | 37 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.03 | 0.00 | 0.03 | 0.08 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.03 | 0.34 | 37 |
| Mean Wind Speed (Knots) | 10.5 | 10.1 | 10.3 | 10.2 | 8.9 | 8.0 | 7.4 | 7.1 | 7.6 | 8.6 | 9.8 | 9.9 | 9.0 | 37 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 4.0 | 5.9 | 5.6 | 5.5 | 5.5 | 5.1 | 5.6 | 5.7 | 6.5 | 4.5 | 4.0 | 4.4 | 5.2 | 37 |
| North Northeast | 2.7 | 4.8 | 5.3 | 5.5 | 5.8 | 6.2 | 4.7 | 5.7 | 5.7 | 4.0 | 3.2 | 3.0 | 4.7 | 37 |
| Northeast | 3.9 | 5.4 | 6.1 | 6.2 | 6.6 | 5.5 | 4.5 | 4.7 | 5.0 | 3.8 | 3.4 | 3.1 | 4.8 | 37 |
| East Northeast | 3.2 | 4.6 | 6.1 | 5.3 | 4.8 | 3.9 | 2.8 | 3.3 | 3.5 | 3.4 | 3.2 | 3.0 | 3.9 | 37 |
| East | 3.1 | 4.2 | 6.1 | 5.9 | 5.5 | 4.0 | 3.3 | 3.3 | 3.5 | 3.4 | 2.8 | 3.4 | 4.0 | 37 |
| East Southeast | 2.3 | 3.1 | 4.4 | 5.0 | 5.0 | 3.9 | 3.2 | 3.2 | 3.4 | 2.9 | 2.8 | 3.0 | 3.5 | 37 |
| Southeast | 2.6 | 2.4 | 4.1 | 4.5 | 5.6 | 5.1 | 3.9 | 3.1 | 4.0 | 3.7 | 3.2 | 2.9 | 3.8 | 37 |
| South Southeast | 3.2 | 2.6 | 3.9 | 5.0 | 5.7 | 5.2 | 4.7 | 4.4 | 4.9 | 5.4 | 4.8 | 3.6 | 4.5 | 37 |
| South | 6.7 | 5.6 | 5.8 | 6.4 | 6.4 | 7.3 | 8.0 | 8.0 | 8.7 | 9.1 | 8.3 | 7.3 | 7.3 | 37 |
| South Southwest | 7.9 | 6.8 | 5.3 | 5.4 | 6.2 | 6.9 | 8.1 | 8.3 | 7.3 | 8.0 | 8.4 | 8.3 | 7.2 | 37 |
| Southwest | 14.8 | 11.4 | 7.3 | 7.8 | 7.8 | 11.4 | 11.8 | 11.9 | 10.4 | 12.2 | 13.8 | 14.5 | 11.3 | 37 |
| West Southwest | 15.5 | 10.8 | 8.3 | 8.4 | 8.0 | 9.7 | 9.9 | 8.9 | 7.6 | 10.2 | 12.9 | 12.8 | 10.3 | 37 |
| West | 9.1 | 8.6 | 7.9 | 7.6 | 7.0 | 6.6 | 7.4 | 6.6 | 6.4 | 7.2 | 8.6 | 9.2 | 7.7 | 37 |
| West Northwest | 9.7 | 10.0 | 9.7 | 8.1 | 7.1 | 6.9 | 7.6 | 7.2 | 7.6 | 8.3 | 8.7 | 8.7 | 8.3 | 37 |
| Northwest | 6.0 | 6.9 | 6.9 | 5.9 | 5.1 | 4.3 | 5.6 | 5.7 | 5.5 | 5.9 | 6.2 | 6.5 | 5.9 | 37 |
| North Northwest | 3.6 | 4.4 | 4.6 | 4.1 | 3.5 | 2.8 | 3.9 | 3.9 | 4.0 | 4.0 | 3.7 | 3.7 | 3.8 | 37 |
| Calm | 2.2 | 2.4 | 2.6 | 2.9 | 4.4 | 5.2 | 5.1 | 6.3 | 6.0 | 4.1 | 2.6 | 2.7 | 3.9 | 37 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 8.5 | 9.4 | 9.5 | 9.7 | 8.5 | 7.9 | 7.3 | 7.2 | 7.7 | 8.4 | 8.4 | 8.9 | 8.4 | 37 |
| North Northeast | 9.4 | 10.2 | 10.3 | 10.4 | 9.5 | 8.7 | 7.7 | 7.8 | 8.1 | 8.4 | 9.1 | 10.3 | 9.1 | 37 |
| Northeast | 10.6 | 11.0 | 10.7 | 10.2 | 8.9 | 8.9 | 8.0 | 8.4 | 8.2 | 8.5 | 9.0 | 10.4 | 9.4 | 37 |
| East Northeast | 10.0 | 10.1 | 10.2 | 9.8 | 8.5 | 7.2 | 7.2 | 7.0 | 7.2 | 7.6 | 8.8 | 9.6 | 8.8 | 37 |
| East | 8.2 | 7.9 | 9.2 | 9.6 | 8.1 | 6.9 | 6.3 | 6.3 | 6.3 | 6.8 | 7.0 | 7.8 | 7.8 | 37 |
| East Southeast | 8.0 | 7.9 | 8.0 | 8.6 | 8.2 | 7.2 | 6.8 | 6.3 | 6.7 | 6.9 | 7.3 | 7.3 | 7.5 | 37 |
| Southeast | 8.6 | 8.9 | 8.8 | 9.0 | 8.4 | 7.6 | 7.3 | 7.3 | 7.4 | 7.9 | 8.2 | 8.4 | 8.1 | 37 |
| South Southeast | 8.7 | 8.6 | 8.6 | 8.7 | 8.3 | 7.6 | 7.4 | 7.2 | 7.4 | 8.0 | 8.6 | 8.1 | 8.1 | 37 |
| South | 8.6 | 8.0 | 8.5 | 8.7 | 7.8 | 7.3 | 6.9 | 6.8 | 7.2 | 8.3 | 9.0 | 8.1 | 7.9 | 37 |
| South Southwest | 10.3 | 9.9 | 10.9 | 10.5 | 9.4 | 8.2 | 7.9 | 7.4 | 8.3 | 9.3 | 9.8 | 9.9 | 9.2 | 37 |
| Southwest | 11.5 | 11.6 | 13.1 | 13.0 | 11.2 | 9.3 | 8.4 | 8.2 | 9.1 | 10.3 | 11.4 | 11.4 | 10.6 | 37 |
| West Southwest | 12.5 | 11.5 | 11.9 | 12.4 | 10.7 | 9.1 | 8.2 | 8.0 | 8.6 | 9.9 | 11.6 | 11.1 | 10.6 | 37 |
| West | 11.6 | 11.4 | 11.0 | 11.9 | 10.4 | 9.1 | 8.0 | 7.4 | 8.3 | 9.3 | 10.9 | 11.1 | 10.2 | 37 |
| West Northwest | 11.5 | 11.2 | 11.7 | 11.7 | 9.7 | 9.6 | 8.3 | 8.0 | 8.7 | 9.6 | 10.4 | 10.5 | 10.2 | 37 |
| Northwest | 11.4 | 11.1 | 11.6 | 11.8 | 10.2 | 9.7 | 8.9 | 8.2 | 9.3 | 9.8 | 11.2 | 11.1 | 10.4 | 37 |
| North Northwest | 10.5 | 10.4 | 10.8 | 10.5 | 9.4 | 9.2 | 8.3 | 8.3 | 8.3 | 9.3 | 10.2 | 10.6 | 9.7 | 37 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 12 | 11 | 13 | 11 | 12 | 12 | 13 | 17 | 15 | 15 | 14 | 14 | 159 | 37 |
| Percent Obs with Visibility <= 1/2 mile | 1.57 | 1.61 | 1.38 | 0.40 | 0.20 | 0.26 | 0.16 | 0.45 | 0.56 | 0.83 | 0.81 | 1.86 | 0.84 | 37 |

## CLIMATOLOGICAL TABLE

### MOUNT CLEMENS, MI (42°36'N,082°50'W) Elevation 604 feet (184.1 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1018.9 | 1017.8 | 1016.2 | 1016.1 | 1015.2 | 1014.5 | 1015.9 | 1016.6 | 1018.0 | 1018.6 | 1017.1 | 1017.8 | 1016.9 | 23 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 24.5 | 26.0 | 33.6 | 46.5 | 57.0 | 67.6 | 72.1 | 70.3 | 63.0 | 53.0 | 39.8 | 28.8 | 48.6 | 22 |
| Mean Daily Maximum | 30.8 | 32.9 | 40.8 | 55.5 | 67.0 | 77.6 | 81.8 | 79.8 | 72.3 | 62.0 | 46.5 | 34.6 | 56.9 | 22 |
| Mean Daily Minimum | 17.6 | 18.5 | 25.8 | 37.0 | 46.5 | 57.1 | 62.0 | 60.3 | 53.1 | 43.5 | 32.6 | 22.6 | 39.8 | 22 |
| Extreme Highest | 63 | 64 | 73 | 87 | 92 | 98 | 98 | 99 | 100 | 89 | 80 | 64 | 100 | 22 |
| Extreme Lowest | -13 | -8 | 0 | 14 | 24 | 35 | 40 | 40 | 29 | 17 | 4 | -4 | -13 | 22 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 64.1 | 53.3 | 37.4 | 36.2 | 27.5 | 20.5 | 34.5 | 41.1 | 54.7 | 60.7 | 46.2 | 53.4 | 44.0 | 32 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 13.2 | 16.4 | 17.1 | 18.3 | 16.9 | 17.7 | 21.8 | 24.9 | 26.0 | 28.0 | 13.2 | 12.3 | 18.8 | 25 |
| Percent of time Scattered | 14.4 | 16.4 | 15.8 | 17.1 | 23.0 | 25.6 | 29.9 | 29.1 | 24.7 | 21.2 | 15.2 | 14.3 | 20.6 | 25 |
| Percent of time Broken | 15.7 | 16.8 | 17.9 | 19.6 | 23.3 | 26.5 | 25.5 | 23.9 | 22.2 | 19.7 | 18.9 | 15.2 | 20.5 | 25 |
| Percent of time Overcast | 56.7 | 50.5 | 49.1 | 44.9 | 36.8 | 30.2 | 22.7 | 22.1 | 27.1 | 31.1 | 52.7 | 58.3 | 40.1 | 25 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 1.73 | 1.63 | 2.15 | 2.87 | 2.36 | 3.01 | 2.24 | 2.56 | 2.10 | 2.16 | 2.08 | 2.29 | 27.18 | 22 |
| Greatest Amount (inches) | 3.19 | 3.78 | 4.46 | 4.76 | 4.83 | 7.58 | 4.38 | 4.65 | 5.00 | 4.46 | 3.98 | 5.32 | 35.89 | 22 |
| Least Amount (inches) | 0.42 | 0.09 | 0.53 | 1.12 | 0.91 | 0.22 | 0.95 | 0.37 | 0.37 | 0.30 | 0.67 | 0.13 | 15.83 | 22 |
| Maximum in 24 hrs. (inches) | 1.30 | 1.69 | 1.85 | 1.50 | 1.40 | 2.88 | 2.12 | 1.73 | 2.06 | 2.46 | 1.13 | 2.31 | 2.88 | 22 |
| Mean Number of Days with Precipitation | 22 | 19 | 20 | 17 | 16 | 14 | 13 | 13 | 13 | 12 | 18 | 22 | 199 | 22 |
| Mean Snowfall Amount (inches) | 7.7 | 6.6 | 5.3 | 0.8 | T | 0.0 | 0.0 | 0.0 | 0.0 | T | 3.1 | 6.7 | 30.2 | 22 |
| Greatest Snowfall Amount (inches) | 15.6 | 15.1 | 20.7 | 3.9 | T | 0.0 | 0.0 | 0.0 | 0.0 | T | 11.2 | 19.7 | 50.1 | 22 |
| Least Snowfall Amount (inches) | 0.8 | T | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 0.1 | 13.8 | 22 |
| Maximum Snowfall in 24 hrs. (inches) | 6.0 | 8.3 | 9.9 | 2.6 | T | 0.0 | 0.0 | 0.0 | 0.0 | T | 5.0 | 7.8 | 9.9 | 22 |
| Mean Number of Days with Snow | 19 | 16 | 13 | 5 | Miss | 0 | 0 | 0 | 0 | 1 | 8 | 17 | 79 | 22 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.11 | 0.11 | 0.16 | 0.07 | 0.00 | 0.03 | 0.00 | 0.00 | 0.03 | 0.00 | 0.08 | 0.03 | 0.05 | 32 |
| Mean Wind Speed (Knots) | 9.1 | 9.0 | 9.2 | 9.0 | 7.9 | 6.9 | 6.3 | 6.1 | 6.8 | 7.3 | 9.0 | 9.0 | 8.0 | 32 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 4.4 | 5.3 | 6.6 | 6.1 | 6.9 | 5.4 | 5.0 | 5.8 | 5.7 | 4.6 | 4.2 | 3.8 | 5.3 | 32 |
| North Northeast | 3.9 | 4.8 | 6.2 | 6.7 | 7.5 | 5.3 | 5.5 | 4.6 | 3.8 | 3.9 | 3.0 | 3.0 | 4.8 | 32 |
| Northeast | 3.1 | 4.1 | 5.1 | 5.6 | 5.1 | 5.3 | 4.7 | 4.0 | 3.7 | 2.7 | 2.0 | 2.2 | 4.0 | 32 |
| East Northeast | 3.2 | 3.4 | 4.6 | 4.8 | 4.6 | 4.6 | 3.9 | 3.3 | 3.7 | 2.4 | 2.2 | 1.9 | 3.5 | 32 |
| East | 2.1 | 2.0 | 3.4 | 3.9 | 3.5 | 3.8 | 3.4 | 3.4 | 3.4 | 2.7 | 2.1 | 2.4 | 3.0 | 32 |
| East Southeast | 2.1 | 2.2 | 4.0 | 3.8 | 3.4 | 3.2 | 2.8 | 2.8 | 3.1 | 2.4 | 2.1 | 2.5 | 2.9 | 32 |
| Southeast | 2.6 | 3.3 | 4.5 | 5.5 | 6.0 | 6.2 | 4.7 | 4.8 | 5.3 | 4.5 | 2.6 | 2.2 | 4.4 | 32 |
| South Southeast | 3.7 | 3.4 | 4.5 | 6.7 | 7.4 | 7.3 | 7.1 | 6.8 | 6.9 | 6.3 | 4.5 | 3.8 | 5.7 | 32 |
| South | 6.8 | 6.3 | 6.6 | 7.2 | 8.1 | 8.9 | 8.6 | 7.8 | 9.4 | 9.6 | 9.3 | 7.4 | 8.0 | 32 |
| South Southwest | 7.2 | 5.6 | 3.8 | 4.5 | 5.3 | 6.3 | 5.6 | 6.5 | 6.8 | 7.8 | 8.6 | 8.2 | 6.4 | 32 |
| Southwest | 10.7 | 7.4 | 6.4 | 5.8 | 6.6 | 6.5 | 6.7 | 7.0 | 6.8 | 8.1 | 11.5 | 12.3 | 8.0 | 32 |
| West Southwest | 9.9 | 7.7 | 6.3 | 6.3 | 5.6 | 6.8 | 6.4 | 5.7 | 5.2 | 7.0 | 9.7 | 9.9 | 7.2 | 32 |
| West | 9.7 | 9.4 | 7.9 | 6.7 | 6.1 | 6.1 | 5.9 | 5.6 | 5.8 | 6.8 | 9.0 | 9.9 | 7.4 | 32 |
| West Northwest | 9.4 | 10.6 | 8.6 | 6.5 | 5.4 | 4.9 | 5.7 | 5.2 | 6.3 | 7.0 | 8.8 | 10.3 | 7.4 | 32 |
| Northwest | 6.8 | 7.4 | 6.4 | 5.4 | 4.4 | 3.8 | 4.5 | 5.2 | 5.6 | 5.9 | 6.4 | 6.7 | 5.7 | 32 |
| North Northwest | 7.2 | 8.8 | 7.8 | 7.2 | 5.7 | 5.0 | 6.2 | 7.6 | 6.1 | 6.6 | 6.3 | 6.4 | 6.7 | 32 |
| Calm | 7.4 | 7.9 | 6.9 | 7.0 | 7.9 | 10.4 | 13.2 | 13.9 | 12.5 | 11.8 | 7.8 | 7.1 | 9.5 | 32 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 8.2 | 9.0 | 9.2 | 9.3 | 8.7 | 7.3 | 6.6 | 6.8 | 7.1 | 7.1 | 8.3 | 8.6 | 8.0 | 32 |
| North Northeast | 9.1 | 9.5 | 9.7 | 10.0 | 8.6 | 7.4 | 7.2 | 7.7 | 7.5 | 7.9 | 8.8 | 8.7 | 8.6 | 32 |
| Northeast | 9.7 | 8.7 | 8.7 | 9.1 | 7.8 | 7.3 | 7.4 | 7.2 | 7.3 | 7.7 | 8.0 | 9.4 | 8.1 | 32 |
| East Northeast | 8.8 | 8.1 | 8.7 | 8.1 | 6.7 | 6.3 | 6.1 | 6.2 | 6.9 | 7.1 | 9.3 | 9.0 | 7.5 | 32 |
| East | 7.8 | 6.9 | 8.2 | 7.3 | 6.3 | 6.3 | 5.6 | 5.6 | 6.3 | 6.3 | 7.9 | 7.9 | 6.8 | 32 |
| East Southeast | 9.3 | 9.3 | 8.9 | 8.9 | 7.1 | 6.7 | 6.2 | 6.5 | 6.8 | 7.0 | 8.7 | 8.7 | 7.8 | 32 |
| Southeast | 10.7 | 9.7 | 9.6 | 9.6 | 8.6 | 7.6 | 7.7 | 7.2 | 7.7 | 7.9 | 9.7 | 9.2 | 8.6 | 32 |
| South Southeast | 9.1 | 9.4 | 8.7 | 9.4 | 8.8 | 8.1 | 7.9 | 8.0 | 8.4 | 8.7 | 10.7 | 9.5 | 8.7 | 32 |
| South | 9.1 | 9.6 | 9.7 | 9.0 | 8.7 | 8.0 | 7.5 | 7.6 | 8.6 | 8.7 | 10.1 | 9.2 | 8.8 | 32 |
| South Southwest | 11.0 | 10.9 | 10.9 | 11.5 | 9.9 | 8.7 | 8.0 | 7.6 | 9.1 | 9.2 | 11.4 | 10.6 | 9.9 | 32 |
| Southwest | 11.1 | 11.3 | 12.4 | 11.2 | 10.1 | 8.6 | 8.0 | 7.7 | 8.7 | 9.3 | 11.1 | 11.2 | 10.2 | 32 |
| West Southwest | 10.3 | 10.4 | 11.6 | 10.8 | 9.8 | 8.6 | 7.6 | 7.1 | 7.6 | 8.2 | 9.9 | 9.7 | 9.4 | 32 |
| West | 9.5 | 9.5 | 9.9 | 10.1 | 8.8 | 7.9 | 6.8 | 6.7 | 7.3 | 8.0 | 9.2 | 9.3 | 8.6 | 32 |
| West Northwest | 10.3 | 10.5 | 10.6 | 10.4 | 8.9 | 8.3 | 7.1 | 6.7 | 8.0 | 8.8 | 9.6 | 9.5 | 9.3 | 32 |
| Northwest | 9.8 | 9.8 | 10.2 | 10.1 | 8.6 | 7.6 | 7.7 | 7.0 | 7.4 | 8.2 | 9.0 | 9.8 | 8.9 | 32 |
| North Northwest | 10.0 | 9.8 | 9.9 | 9.7 | 8.5 | 7.3 | 7.1 | 6.8 | 7.5 | 8.2 | 8.8 | 9.6 | 8.7 | 32 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 12 | 11 | 12 | 11 | 9 | 11 | 9 | 13 | 13 | 13 | 12 | 12 | 138 | 22 |
| Percent Obs with Visibility <= 1/2 mile | 2.28 | 2.21 | 1.82 | 1.08 | 0.55 | 0.38 | 0.22 | 0.49 | 0.83 | 1.48 | 1.17 | 2.20 | 1.22 | 32 |

# CLIMATOLOGICAL TABLE

## ALPENA, MI (45°04'N,083°34'W) Elevation 689 feet (210 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1016.3 | 1017.8 | 1016.8 | 1015.1 | 1014.9 | 1014.2 | 1014.9 | 1016.7 | 1017.2 | 1017.3 | 1015.9 | 1016.9 | 1016.2 | 34 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 18.1 | 18.7 | 28.1 | 41.1 | 52.5 | 61.6 | 67.1 | 65.0 | 57.1 | 46.8 | 35.4 | 24.3 | 43.1 | 36 |
| Mean Daily Maximum | 26.5 | 28.3 | 37.8 | 51.5 | 64.9 | 74.5 | 79.7 | 76.9 | 68.3 | 56.7 | 42.7 | 31.3 | 53.4 | 36 |
| Mean Daily Minimum | 9.2 | 8.5 | 17.8 | 30.2 | 39.6 | 48.2 | 54.1 | 52.7 | 45.5 | 36.5 | 27.5 | 16.8 | 32.3 | 36 |
| Extreme Highest | 52 | 65 | 76 | 90 | 94 | 103 | 102 | 102 | 94 | 88 | 76 | 65 | 103 | 36 |
| Extreme Lowest | -28 | -37 | -27 | 0 | 20 | 28 | 34 | 30 | 25 | 16 | -6 | -18 | -37 | 36 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 38.4 | 53.3 | 42.7 | 25.9 | 24.0 | 16.8 | 23.9 | 41.9 | 46.6 | 48.3 | 33.9 | 43.7 | 36.8 | 36 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 10.1 | 14.0 | 21.6 | 20.1 | 22.1 | 22.6 | 20.5 | 22.4 | 20.1 | 17.0 | 9.8 | 7.6 | 17.3 | 30 |
| Percent of time Scattered | 13.1 | 14.1 | 14.3 | 14.8 | 19.3 | 23.9 | 27.5 | 25.6 | 21.5 | 16.9 | 11.4 | 12.3 | 18.0 | 30 |
| Percent of time Broken | 14.4 | 15.1 | 14.2 | 16.2 | 19.7 | 20.8 | 23.7 | 20.9 | 18.6 | 17.6 | 14.5 | 13.4 | 17.5 | 30 |
| Percent of time Overcast | 62.4 | 56.8 | 49.9 | 48.9 | 38.9 | 32.7 | 28.2 | 31.1 | 39.8 | 48.4 | 64.3 | 66.7 | 47.3 | 30 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 1.63 | 1.24 | 2.00 | 2.36 | 2.76 | 2.95 | 3.03 | 3.45 | 2.92 | 2.24 | 2.31 | 1.86 | 28.75 | 36 |
| Greatest Amount (inches) | 3.31 | 3.17 | 4.44 | 4.15 | 8.29 | 8.37 | 7.17 | 6.26 | 7.12 | 6.53 | 7.45 | 4.44 | 35.23 | 36 |
| Least Amount (inches) | 0.16 | 0.12 | 0.34 | 1.18 | 0.99 | 0.20 | 0.22 | 0.92 | 0.28 | 0.61 | 0.61 | 0.39 | 21.41 | 36 |
| Maximum in 24 hrs. (inches) | 1.83 | 1.01 | 1.52 | 1.12 | 2.21 | 2.52 | 2.80 | 2.61 | 3.02 | 1.76 | 1.82 | 1.63 | 3.02 | 36 |
| Mean Number of Days with Precipitation | 27 | 22 | 20 | 17 | 16 | 15 | 15 | 15 | 17 | 19 | 22 | 26 | 231 | 31 |
| Mean Snowfall Amount (inches) | 21.9 | 15.9 | 13.1 | 4.9 | 0.2 | 0.0 | 0.0 | 0.0 | T | 0.6 | 9.1 | 19.9 | 85.7 | 36 |
| Greatest Snowfall Amount (inches) | 43.5 | 33.4 | 35.8 | 12.7 | 3.7 | 0.0 | 0.0 | 0.0 | T | 4.3 | 34.8 | 46.3 | 146.0 | 36 |
| Least Snowfall Amount (inches) | 5.1 | 3.6 | 2.8 | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 1.8 | 52.1 | 36 |
| Maximum Snowfall in 24 hrs. (inches) | 16.3 | 11.4 | 17.3 | 10.8 | 3.7 | 0.0 | 0.0 | 0.0 | T | 2.4 | 15.0 | 16.4 | 17.3 | 36 |
| Mean Number of Days with Snow | 26 | 21 | 16 | 8 | 1 | 0 | 0 | 0 | Miss | 5 | 15 | 24 | 116 | 31 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 34 |
| Mean Wind Speed (Knots) | 7.8 | 7.5 | 7.8 | 8.1 | 7.3 | 6.7 | 6.2 | 5.9 | 6.3 | 7.0 | 7.6 | 7.4 | 7.1 | 34 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 4.1 | 6.0 | 6.3 | 6.5 | 6.3 | 4.7 | 4.3 | 3.7 | 3.9 | 3.2 | 3.7 | 3.7 | 4.7 | 34 |
| North Northeast | 2.4 | 3.8 | 4.0 | 4.5 | 4.0 | 3.7 | 2.5 | 2.5 | 2.6 | 2.4 | 2.8 | 2.4 | 3.1 | 34 |
| Northeast | 2.1 | 3.0 | 3.5 | 4.7 | 3.7 | 3.2 | 2.7 | 2.8 | 2.4 | 2.4 | 2.5 | 2.3 | 2.9 | 34 |
| East Northeast | 1.3 | 2.0 | 3.8 | 3.8 | 3.2 | 2.4 | 1.9 | 2.4 | 2.2 | 1.6 | 2.0 | 1.9 | 2.4 | 34 |
| East | 1.9 | 2.9 | 5.1 | 5.5 | 5.7 | 4.7 | 3.3 | 3.0 | 3.0 | 2.8 | 2.4 | 2.1 | 3.5 | 34 |
| East Southeast | 2.4 | 3.0 | 7.3 | 9.0 | 10.9 | 8.5 | 7.2 | 5.9 | 4.8 | 4.9 | 3.6 | 3.1 | 5.9 | 34 |
| Southeast | 3.9 | 4.2 | 6.7 | 7.8 | 9.0 | 8.7 | 7.2 | 6.8 | 6.3 | 5.9 | 5.0 | 4.4 | 6.3 | 34 |
| South Southeast | 5.5 | 4.5 | 4.5 | 3.5 | 4.8 | 4.8 | 4.6 | 5.1 | 6.3 | 6.0 | 6.2 | 5.9 | 5.1 | 34 |
| South | 8.0 | 6.9 | 5.2 | 4.2 | 4.6 | 6.0 | 5.6 | 6.5 | 8.0 | 9.1 | 8.4 | 8.4 | 6.7 | 34 |
| South Southwest | 6.7 | 5.2 | 4.0 | 3.6 | 3.5 | 4.8 | 4.9 | 5.9 | 6.5 | 7.5 | 7.0 | 7.7 | 5.6 | 34 |
| Southwest | 11.1 | 7.0 | 4.8 | 5.1 | 5.3 | 6.5 | 8.1 | 9.3 | 8.9 | 9.5 | 10.4 | 11.8 | 8.2 | 34 |
| West Southwest | 11.4 | 8.6 | 6.6 | 5.6 | 5.9 | 7.7 | 9.0 | 9.2 | 8.8 | 9.9 | 10.4 | 11.3 | 8.7 | 34 |
| West | 11.3 | 10.8 | 7.7 | 7.4 | 7.2 | 8.1 | 9.2 | 9.3 | 9.1 | 9.6 | 9.8 | 10.2 | 9.1 | 34 |
| West Northwest | 12.0 | 13.0 | 11.0 | 9.7 | 8.3 | 8.6 | 10.2 | 9.3 | 9.0 | 9.0 | 10.7 | 10.8 | 10.1 | 34 |
| Northwest | 8.6 | 8.9 | 8.6 | 8.6 | 7.5 | 7.1 | 7.7 | 6.5 | 6.8 | 6.9 | 7.0 | 7.2 | 7.6 | 34 |
| North Northwest | 4.1 | 5.5 | 5.9 | 6.5 | 5.1 | 4.3 | 4.7 | 4.1 | 3.7 | 3.5 | 4.2 | 3.7 | 4.6 | 34 |
| Calm | 3.7 | 4.6 | 4.9 | 4.4 | 5.5 | 6.1 | 6.9 | 7.7 | 7.1 | 6.0 | 3.9 | 3.4 | 5.3 | 34 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 7.7 | 7.7 | 8.3 | 8.8 | 8.3 | 8.0 | 7.0 | 6.9 | 6.8 | 7.6 | 7.5 | 7.0 | 7.8 | 34 |
| North Northeast | 9.0 | 8.2 | 8.3 | 8.7 | 8.0 | 7.4 | 7.3 | 7.1 | 7.3 | 7.8 | 8.4 | 8.3 | 8.0 | 34 |
| Northeast | 10.5 | 8.9 | 8.7 | 8.4 | 7.8 | 7.3 | 6.6 | 7.2 | 7.3 | 8.0 | 8.4 | 8.9 | 8.1 | 34 |
| East Northeast | 9.2 | 8.9 | 8.7 | 8.3 | 7.8 | 6.9 | 6.7 | 6.7 | 6.9 | 7.9 | 8.9 | 9.0 | 8.0 | 34 |
| East | 8.0 | 7.3 | 8.8 | 8.5 | 7.7 | 6.8 | 6.8 | 6.3 | 6.3 | 6.6 | 7.9 | 7.9 | 7.5 | 34 |
| East Southeast | 9.4 | 8.1 | 8.6 | 9.1 | 8.2 | 7.6 | 7.4 | 7.3 | 7.4 | 8.0 | 8.8 | 8.7 | 8.1 | 34 |
| Southeast | 9.0 | 8.6 | 8.7 | 8.6 | 7.6 | 7.2 | 7.0 | 6.9 | 7.2 | 7.9 | 8.6 | 8.5 | 7.9 | 34 |
| South Southeast | 7.6 | 7.0 | 7.2 | 6.8 | 6.2 | 5.9 | 5.9 | 5.8 | 6.1 | 7.0 | 7.3 | 6.9 | 6.7 | 34 |
| South | 6.9 | 7.1 | 6.7 | 6.8 | 6.7 | 6.0 | 6.0 | 5.9 | 6.5 | 7.1 | 7.1 | 6.9 | 6.7 | 34 |
| South Southwest | 7.0 | 7.2 | 7.1 | 7.6 | 7.2 | 6.6 | 6.6 | 6.1 | 6.6 | 7.1 | 7.4 | 6.6 | 6.9 | 34 |
| Southwest | 7.3 | 7.5 | 7.9 | 8.5 | 8.0 | 6.9 | 6.2 | 5.8 | 6.5 | 7.2 | 7.6 | 7.1 | 7.1 | 34 |
| West Southwest | 7.4 | 7.1 | 7.2 | 8.0 | 7.3 | 6.7 | 6.0 | 5.8 | 6.2 | 6.9 | 7.6 | 7.4 | 6.9 | 34 |
| West | 7.5 | 6.9 | 7.3 | 7.6 | 7.0 | 6.5 | 6.0 | 5.8 | 6.2 | 6.9 | 7.5 | 7.3 | 6.9 | 34 |
| West Northwest | 8.5 | 8.2 | 8.5 | 8.5 | 7.8 | 7.5 | 6.6 | 6.3 | 6.7 | 7.6 | 8.0 | 7.8 | 7.7 | 34 |
| Northwest | 10.2 | 9.3 | 9.6 | 9.6 | 8.6 | 8.3 | 7.7 | 7.4 | 8.4 | 8.6 | 9.1 | 9.5 | 8.9 | 34 |
| North Northwest | 9.3 | 9.2 | 9.6 | 9.8 | 9.0 | 9.1 | 8.3 | 7.7 | 8.1 | 8.8 | 8.7 | 9.0 | 8.9 | 34 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 10 | 9 | 13 | 12 | 13 | 14 | 14 | 17 | 16 | 14 | 14 | 12 | 158 | 31 |
| Percent Obs with Visibility <= 1/2 mile | 1.47 | 1.22 | 2.62 | 1.44 | 1.08 | 0.74 | 0.72 | 1.16 | 1.23 | 1.95 | 1.41 | 1.37 | 1.34 | 34 |

## CLIMATOLOGICAL TABLE

### MUSKEGON, MI (43°10'N,086°14'W) Elevation 628 feet (191.4 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEA LEVEL PRESSURE** | | | | | | | | | | | | | | |
| Mean (Millibars) | 1018.0 | 1018.3 | 1016.3 | 1014.8 | 1015.1 | 1014.3 | 1015.5 | 1016.6 | 1017.6 | 1017.9 | 1016.3 | 1017.9 | 1016.6 | 46 |
| **TEMPERATURE (DEGREES F)** | | | | | | | | | | | | | | |
| Mean | 23.8 | 24.9 | 33.4 | 45.4 | 56.3 | 65.7 | 70.6 | 69.2 | 61.4 | 50.9 | 39.3 | 28.8 | 47.6 | 48 |
| Mean Daily Maximum | 29.6 | 31.4 | 41.1 | 54.6 | 66.8 | 76.1 | 80.5 | 78.7 | 70.8 | 59.4 | 45.6 | 34.2 | 55.9 | 48 |
| Mean Daily Minimum | 17.5 | 17.9 | 25.2 | 35.7 | 45.3 | 54.8 | 60.3 | 59.1 | 51.5 | 41.8 | 32.5 | 22.9 | 38.8 | 48 |
| Extreme Highest | 63 | 62 | 80 | 86 | 93 | 98 | 96 | 99 | 95 | 83 | 76 | 64 | 99 | 48 |
| Extreme Lowest | -13 | -14 | -6 | 1 | 23 | 31 | 41 | 36 | 27 | 21 | -14 | -15 | -15 | 48 |
| **RELATIVE HUMIDITY** | | | | | | | | | | | | | | |
| Average Percentage | 55.1 | 57.9 | 38.1 | 22.9 | 26.0 | 18.5 | 30.2 | 41.1 | 50.7 | 54.2 | 37.8 | 54.5 | 40.6 | 48 |
| **CLOUD COVER** | | | | | | | | | | | | | | |
| Percent of time Clear | 5.9 | 11.3 | 17.3 | 22.2 | 25.1 | 25.8 | 28.2 | 26.8 | 26.3 | 24.2 | 10.0 | 6.8 | 19.2 | 41 |
| Percent of time Scattered | 7.9 | 10.6 | 13.1 | 13.7 | 18.0 | 21.4 | 24.2 | 24.1 | 20.0 | 16.2 | 9.4 | 7.1 | 15.5 | 41 |
| Percent of time Broken | 10.4 | 12.4 | 13.8 | 14.1 | 15.9 | 19.0 | 19.7 | 18.8 | 17.2 | 16.3 | 12.8 | 10.0 | 15.0 | 41 |
| Percent of time Overcast | 75.9 | 65.7 | 55.8 | 50.0 | 41.0 | 33.8 | 27.9 | 30.3 | 36.5 | 43.3 | 67.8 | 76.2 | 50.3 | 41 |
| **PRECIPITATION** | | | | | | | | | | | | | | |
| Mean Amount (inches) | 2.30 | 1.65 | 2.51 | 3.04 | 2.62 | 2.53 | 2.51 | 3.29 | 3.32 | 2.84 | 3.24 | 2.72 | 32.56 | 48 |
| Greatest Amount (inches) | 4.55 | 2.85 | 6.59 | 6.11 | 6.48 | 5.46 | 6.63 | 9.88 | 13.55 | 7.33 | 6.61 | 5.42 | 42.27 | 48 |
| Least Amount (inches) | 0.45 | 0.36 | 0.55 | 0.72 | 0.33 | 0.19 | 0.47 | 0.11 | 0.17 | 0.51 | 0.62 | 0.91 | 23.12 | 48 |
| Maximum in 24 hrs. (inches) | 1.56 | 1.39 | 2.10 | 2.12 | 2.15 | 2.34 | 2.54 | 3.45 | 4.33 | 3.21 | 2.12 | 2.58 | 4.33 | 48 |
| Mean Number of Days with Precipitation | 25 | 20 | 19 | 17 | 15 | 13 | 13 | 13 | 14 | 15 | 20 | 24 | 208 | 48 |
| Mean Snowfall Amount (inches) | 33.6 | 18.5 | 11.9 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | T | 0.5 | 9.3 | 26.8 | 103.6 | 48 |
| Greatest Snowfall Amount (inches) | 102.4 | 45.8 | 35.7 | 20.4 | 0.4 | 0.0 | 0.0 | 0.0 | T | 4.9 | 25.7 | 82.6 | 182.2 | 48 |
| Least Snowfall Amount (inches) | 6.5 | 0.5 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 4.3 | 43.1 | 48 |
| Maximum Snowfall in 24 hrs. (inches) | 22.0 | 14.2 | 9.1 | 12.0 | 0.3 | 0.0 | 0.0 | 0.0 | T | 4.7 | 8.7 | 14.8 | 22.0 | 48 |
| Mean Number of Days with Snow | 23 | 18 | 14 | 5 | Miss | 0 | 0 | 0 | Miss | 2 | 11 | 20 | 93 | 48 |
| **WIND** | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.07 | 0.01 | 0.09 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.06 | 0.50 | 45 |
| Mean Wind Speed (Knots) | 10.6 | 10.0 | 10.2 | 10.1 | 8.8 | 8.1 | 7.7 | 7.4 | 8.1 | 9.2 | 10.6 | 10.3 | 9.2 | 45 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 5.9 | 6.9 | 6.3 | 6.3 | 5.3 | 4.7 | 4.5 | 5.3 | 5.9 | 5.3 | 6.4 | 6.0 | 5.7 | 45 |
| North Northeast | 2.7 | 3.7 | 3.7 | 3.5 | 3.1 | 2.8 | 2.8 | 3.3 | 3.3 | 3.4 | 3.5 | 2.8 | 3.2 | 45 |
| Northeast | 3.5 | 4.2 | 4.0 | 3.8 | 4.0 | 3.3 | 3.4 | 4.2 | 4.2 | 3.2 | 2.8 | 3.1 | 3.6 | 45 |
| East Northeast | 4.2 | 6.3 | 6.5 | 4.9 | 5.1 | 4.1 | 3.7 | 3.9 | 3.9 | 3.7 | 3.4 | 4.1 | 4.5 | 45 |
| East | 6.4 | 8.0 | 9.3 | 8.3 | 7.8 | 6.2 | 4.9 | 5.4 | 6.0 | 6.4 | 5.7 | 6.4 | 6.7 | 45 |
| East Southeast | 6.3 | 5.8 | 7.3 | 6.9 | 6.2 | 5.0 | 4.3 | 5.1 | 7.1 | 7.0 | 5.8 | 6.8 | 6.1 | 45 |
| Southeast | 6.3 | 4.8 | 5.3 | 5.1 | 4.7 | 4.9 | 4.6 | 5.4 | 7.5 | 7.4 | 7.6 | 7.6 | 5.9 | 45 |
| South Southeast | 4.0 | 3.4 | 3.1 | 3.2 | 3.0 | 3.3 | 3.2 | 3.9 | 5.0 | 4.9 | 5.2 | 4.9 | 3.9 | 45 |
| South | 4.6 | 5.2 | 5.3 | 5.5 | 6.2 | 6.8 | 6.9 | 6.7 | 7.5 | 7.4 | 5.8 | 4.3 | 6.0 | 45 |
| South Southwest | 4.6 | 5.2 | 5.9 | 7.9 | 8.4 | 10.2 | 10.2 | 9.4 | 8.8 | 8.5 | 6.9 | 4.6 | 7.6 | 45 |
| Southwest | 5.8 | 5.3 | 5.3 | 7.1 | 8.9 | 10.8 | 10.7 | 9.7 | 6.6 | 7.0 | 7.0 | 5.9 | 7.5 | 45 |
| West Southwest | 6.9 | 5.8 | 4.7 | 5.4 | 6.7 | 7.6 | 7.8 | 6.4 | 5.0 | 5.1 | 7.2 | 6.9 | 6.3 | 45 |
| West | 8.6 | 6.3 | 5.7 | 6.4 | 7.1 | 7.2 | 7.7 | 6.3 | 5.3 | 5.9 | 7.9 | 8.3 | 6.9 | 45 |
| West Northwest | 11.4 | 8.9 | 8.6 | 8.5 | 7.7 | 7.5 | 8.2 | 7.2 | 6.9 | 7.3 | 9.0 | 10.2 | 8.5 | 45 |
| Northwest | 9.1 | 8.6 | 7.7 | 7.2 | 5.8 | 5.8 | 5.8 | 5.7 | 6.0 | 6.3 | 7.4 | 7.6 | 6.9 | 45 |
| North Northwest | 6.9 | 7.6 | 7.2 | 6.1 | 4.4 | 3.9 | 3.9 | 3.9 | 4.8 | 5.6 | 5.7 | 7.1 | 5.6 | 45 |
| Calm | 2.6 | 3.5 | 3.9 | 3.6 | 5.4 | 5.8 | 7.5 | 8.3 | 6.4 | 5.6 | 2.9 | 3.1 | 4.9 | 45 |
| Direction (Mean Speed, Knots) | | | | | | | | | | | | | | |
| North | 8.6 | 8.9 | 8.9 | 9.0 | 8.0 | 7.6 | 7.1 | 7.2 | 7.5 | 7.9 | 8.6 | 8.5 | 8.2 | 45 |
| North Northeast | 8.2 | 8.1 | 8.2 | 8.6 | 7.7 | 7.5 | 6.8 | 6.7 | 7.0 | 7.7 | 7.9 | 8.1 | 7.7 | 45 |
| Northeast | 7.8 | 7.8 | 8.5 | 8.7 | 7.2 | 6.7 | 6.4 | 6.1 | 6.3 | 6.8 | 7.6 | 7.6 | 7.3 | 45 |
| East Northeast | 8.5 | 9.4 | 10.8 | 10.4 | 8.4 | 7.4 | 7.1 | 6.5 | 6.6 | 7.5 | 8.8 | 8.9 | 8.6 | 45 |
| East | 8.4 | 9.1 | 10.4 | 10.4 | 8.6 | 7.4 | 6.7 | 6.0 | 6.7 | 7.1 | 8.1 | 8.6 | 8.3 | 45 |
| East Southeast | 8.6 | 8.4 | 9.3 | 10.1 | 8.4 | 6.9 | 6.3 | 5.8 | 6.3 | 6.7 | 8.1 | 8.2 | 7.9 | 45 |
| Southeast | 8.5 | 7.7 | 8.7 | 8.8 | 8.0 | 7.2 | 6.1 | 5.9 | 6.5 | 7.0 | 8.1 | 8.3 | 7.6 | 45 |
| South Southeast | 9.0 | 8.7 | 9.2 | 9.8 | 8.8 | 7.6 | 7.1 | 6.9 | 7.8 | 8.8 | 9.2 | 9.6 | 8.6 | 45 |
| South | 10.8 | 10.8 | 11.1 | 11.0 | 10.0 | 9.1 | 8.9 | 8.3 | 9.7 | 11.2 | 11.3 | 11.4 | 10.2 | 45 |
| South Southwest | 14.4 | 13.5 | 14.3 | 13.3 | 12.2 | 10.9 | 10.4 | 10.3 | 11.4 | 13.1 | 14.0 | 14.4 | 12.3 | 45 |
| Southwest | 15.0 | 13.6 | 12.5 | 12.0 | 10.8 | 10.2 | 9.7 | 10.0 | 11.1 | 12.5 | 14.3 | 15.1 | 11.8 | 45 |
| West Southwest | 13.5 | 12.2 | 11.8 | 11.1 | 9.4 | 8.9 | 8.6 | 8.8 | 9.7 | 11.5 | 13.6 | 13.0 | 11.0 | 45 |
| West | 12.3 | 11.1 | 10.2 | 10.0 | 8.8 | 8.4 | 8.9 | 8.2 | 9.1 | 10.4 | 12.2 | 11.7 | 10.1 | 45 |
| West Northwest | 12.0 | 11.3 | 11.4 | 10.9 | 9.6 | 8.7 | 8.8 | 9.1 | 9.9 | 11.1 | 12.6 | 11.9 | 10.7 | 45 |
| Northwest | 11.8 | 11.3 | 11.6 | 10.9 | 9.6 | 8.9 | 8.8 | 9.2 | 10.1 | 11.6 | 12.2 | 11.9 | 10.8 | 45 |
| North Northwest | 11.3 | 11.3 | 11.8 | 11.0 | 9.4 | 9.5 | 8.8 | 9.0 | 9.7 | 10.2 | 10.9 | 10.5 | 10.4 | 45 |
| **VISIBILITY** | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 11 | 10 | 12 | 11 | 11 | 11 | 11 | 14 | 12 | 13 | 12 | 12 | 140 | 48 |
| Percent Obs with Visibility <= 1/2 mile | 1.59 | 1.15 | 1.19 | 0.88 | 0.89 | 0.65 | 0.46 | 0.77 | 0.63 | 0.93 | 1.06 | 1.15 | 0.95 | 45 |

## CLIMATOLOGICAL TABLE

### CHICAGO, IL (41°59'N,087°54'W) Elevation 674 feet (205.4 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1019.3 | 1018.9 | 1016.4 | 1015.0 | 1015.1 | 1014.6 | 1015.7 | 1016.6 | 1017.6 | 1017.6 | 1017.4 | 1019.1 | 1017.0 | 37 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 21.6 | 25.9 | 37.0 | 48.8 | 59.3 | 68.7 | 73.5 | 72.2 | 64.5 | 52.9 | 40.0 | 27.4 | 49.4 | 37 |
| Mean Daily Maximum | 29.1 | 33.6 | 45.4 | 58.5 | 70.2 | 79.6 | 83.7 | 82.1 | 74.7 | 63.0 | 47.9 | 34.5 | 58.6 | 37 |
| Mean Daily Minimum | 13.5 | 17.8 | 28.1 | 38.5 | 48.0 | 57.3 | 62.8 | 61.9 | 53.9 | 42.2 | 31.5 | 19.8 | 39.7 | 37 |
| Extreme Highest | 65 | 71 | 88 | 91 | 93 | 104 | 104 | 101 | 99 | 91 | 78 | 71 | 104 | 37 |
| Extreme Lowest | -27 | -17 | -8 | 7 | 24 | 36 | 40 | 41 | 28 | 17 | 1 | -25 | -27 | 37 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 73.4 | 72.2 | 70.2 | 65.1 | 64.4 | 65.6 | 68.6 | 71.2 | 71.0 | 69.0 | 72.8 | 75.6 | 70.0 | 37 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 23.0 | 21.8 | 19.0 | 19.8 | 22.4 | 22.0 | 23.8 | 24.3 | 24.8 | 27.5 | 18.7 | 20.0 | 22.3 | 37 |
| Percent of time Scattered | 12.4 | 14.6 | 15.1 | 15.4 | 20.4 | 25.5 | 27.1 | 27.3 | 23.2 | 19.2 | 13.5 | 12.3 | 18.8 | 37 |
| Percent of time Broken | 12.6 | 14.5 | 15.8 | 18.9 | 21.4 | 24.3 | 24.2 | 23.2 | 22.2 | 18.1 | 15.6 | 12.2 | 18.6 | 37 |
| Percent of time Overcast | 52.0 | 49.1 | 50.0 | 45.9 | 35.8 | 28.3 | 24.9 | 25.2 | 29.8 | 35.2 | 52.2 | 55.5 | 40.3 | 37 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 1.67 | 1.37 | 2.66 | 3.60 | 3.19 | 3.76 | 3.61 | 4.10 | 3.55 | 2.61 | 2.92 | 2.23 | 35.25 | 37 |
| Greatest Amount (inches) | 4.11 | 3.46 | 5.91 | 7.69 | 7.14 | 9.96 | 8.33 | 17.10 | 11.44 | 7.36 | 8.22 | 8.56 | 49.35 | 37 |
| Least Amount (inches) | 0.10 | 0.12 | 0.63 | 0.97 | 0.30 | 0.95 | 1.18 | 0.51 | 0.02 | 0.16 | 0.65 | 0.23 | 21.77 | 37 |
| Maximum in 24 hrs. (inches) | 2.00 | 1.45 | 1.75 | 2.36 | 3.45 | 3.09 | 2.90 | 6.49 | 2.88 | 4.25 | 2.93 | 4.47 | 6.49 | 37 |
| Mean Number of Days with Precipitation | 19 | 16 | 18 | 17 | 16 | 14 | 14 | 13 | 13 | 14 | 17 | 19 | 190 | 37 |
| Mean Snowfall Amount (inches) | 10.8 | 8.4 | 6.7 | 1.6 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 1.9 | 8.3 | 38.2 | 37 |
| Greatest Snowfall Amount (inches) | 34.3 | 26.2 | 24.7 | 11.1 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 6.6 | 10.4 | 35.3 | 75.0 | 37 |
| Least Snowfall Amount (inches) | 0.4 | T | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 0.2 | 21.4 | 37 |
| Maximum Snowfall in 24 hrs. (inches) | 15.3 | 9.7 | 8.5 | 10.7 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 4.0 | 5.0 | 10.1 | 15.3 | 37 |
| Mean Number of Days with Snow | 16 | 14 | 11 | 4 | Miss | 0 | 0 | 0 | 0 | 1 | 7 | 15 | 68 | 37 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.01 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.04 | 0.01 | 0.32 | 37 |
| Mean Wind Speed (Knots) | 10.2 | 10.0 | 10.3 | 10.5 | 9.1 | 8.0 | 7.2 | 7.1 | 7.7 | 8.8 | 9.7 | 9.6 | 9.0 | 37 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 4.7 | 5.7 | 6.2 | 5.6 | 5.3 | 4.7 | 4.9 | 4.9 | 5.2 | 4.1 | 4.4 | 4.3 | 5.0 | 37 |
| North Northeast | 2.2 | 5.0 | 7.0 | 9.2 | 10.4 | 9.6 | 7.9 | 7.0 | 6.0 | 4.3 | 3.6 | 2.5 | 6.2 | 37 |
| Northeast | 2.4 | 5.3 | 7.3 | 8.7 | 9.6 | 8.5 | 6.6 | 5.9 | 5.0 | 3.9 | 3.2 | 2.4 | 5.7 | 37 |
| East Northeast | 2.0 | 4.5 | 5.2 | 5.7 | 5.7 | 4.5 | 3.8 | 3.6 | 2.9 | 2.8 | 2.0 | 1.9 | 3.7 | 37 |
| East | 1.8 | 3.0 | 4.4 | 5.3 | 4.3 | 3.7 | 3.2 | 2.7 | 3.2 | 2.3 | 1.7 | 1.8 | 3.1 | 37 |
| East Southeast | 2.3 | 2.8 | 4.2 | 4.8 | 4.9 | 3.9 | 3.1 | 3.0 | 3.2 | 2.8 | 1.9 | 2.6 | 3.3 | 37 |
| Southeast | 2.4 | 1.7 | 2.9 | 3.2 | 3.8 | 3.3 | 2.7 | 2.9 | 3.3 | 2.7 | 2.6 | 2.8 | 2.9 | 37 |
| South Southeast | 3.7 | 3.0 | 4.8 | 4.4 | 4.6 | 4.3 | 4.5 | 4.9 | 6.1 | 6.3 | 5.1 | 4.6 | 4.7 | 37 |
| South | 7.5 | 7.1 | 7.1 | 8.6 | 9.0 | 9.1 | 8.8 | 10.2 | 12.1 | 12.3 | 10.8 | 9.1 | 9.3 | 37 |
| South Southwest | 9.6 | 9.0 | 7.6 | 7.9 | 8.1 | 9.9 | 9.6 | 11.3 | 10.9 | 11.9 | 12.6 | 10.4 | 9.9 | 37 |
| Southwest | 9.5 | 7.5 | 6.5 | 6.5 | 7.9 | 9.4 | 11.1 | 11.0 | 8.9 | 8.8 | 10.0 | 9.9 | 8.9 | 37 |
| West Southwest | 12.6 | 9.0 | 7.1 | 6.6 | 6.6 | 7.6 | 9.0 | 7.9 | 6.3 | 8.2 | 9.6 | 9.7 | 8.4 | 37 |
| West | 13.9 | 10.4 | 8.1 | 6.9 | 5.8 | 6.1 | 6.6 | 6.1 | 6.3 | 8.3 | 9.7 | 11.1 | 8.3 | 37 |
| West Northwest | 10.4 | 9.8 | 8.1 | 5.9 | 4.7 | 4.6 | 5.5 | 5.4 | 6.2 | 7.4 | 8.3 | 11.2 | 7.3 | 37 |
| Northwest | 7.5 | 7.1 | 6.2 | 4.4 | 2.9 | 3.3 | 3.7 | 4.0 | 5.0 | 5.6 | 6.7 | 7.2 | 5.3 | 37 |
| North Northwest | 6.3 | 7.4 | 5.7 | 4.1 | 3.0 | 2.5 | 3.4 | 3.5 | 4.7 | 5.1 | 5.9 | 6.2 | 4.8 | 37 |
| Calm | 1.7 | 1.6 | 1.8 | 2.1 | 3.5 | 4.9 | 5.8 | 5.8 | 5.0 | 3.4 | 2.0 | 2.2 | 3.3 | 37 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 9.3 | 10.1 | 10.1 | 10.1 | 8.8 | 7.2 | 6.8 | 7.2 | 8.0 | 8.5 | 8.9 | 8.9 | 8.7 | 37 |
| North Northeast | 10.7 | 11.4 | 10.7 | 11.4 | 9.9 | 9.2 | 8.5 | 8.5 | 9.1 | 10.1 | 10.1 | 10.3 | 9.9 | 37 |
| Northeast | 12.5 | 11.9 | 11.5 | 11.3 | 9.9 | 9.6 | 9.0 | 9.2 | 9.4 | 9.9 | 10.9 | 11.5 | 10.4 | 37 |
| East Northeast | 12.5 | 11.3 | 10.5 | 10.3 | 9.0 | 8.5 | 8.0 | 8.2 | 8.9 | 9.1 | 10.8 | 11.6 | 9.7 | 37 |
| East | 9.5 | 9.4 | 10.2 | 9.7 | 8.6 | 7.8 | 7.2 | 6.9 | 7.4 | 8.0 | 9.3 | 9.1 | 8.7 | 37 |
| East Southeast | 9.4 | 8.8 | 9.6 | 9.0 | 8.3 | 7.8 | 6.9 | 6.9 | 7.6 | 7.8 | 9.1 | 9.5 | 8.4 | 37 |
| Southeast | 9.6 | 9.2 | 9.8 | 9.2 | 8.2 | 7.1 | 6.9 | 6.8 | 7.6 | 7.8 | 8.9 | 9.2 | 8.3 | 37 |
| South Southeast | 9.1 | 9.5 | 9.8 | 9.9 | 8.8 | 7.6 | 7.4 | 6.9 | 7.1 | 8.2 | 8.6 | 8.5 | 8.4 | 37 |
| South | 9.7 | 9.3 | 10.6 | 10.4 | 9.7 | 8.2 | 7.8 | 7.3 | 8.0 | 9.0 | 9.6 | 9.3 | 9.0 | 37 |
| South Southwest | 10.9 | 10.5 | 12.0 | 11.4 | 10.7 | 9.0 | 8.1 | 8.0 | 8.6 | 9.9 | 10.7 | 10.4 | 9.9 | 37 |
| Southwest | 10.5 | 10.9 | 11.5 | 12.9 | 10.7 | 9.0 | 8.0 | 7.9 | 8.6 | 9.8 | 10.3 | 10.4 | 9.8 | 37 |
| West Southwest | 10.1 | 9.8 | 10.4 | 11.3 | 9.7 | 8.3 | 7.5 | 7.0 | 8.0 | 8.6 | 10.2 | 9.6 | 9.2 | 37 |
| West | 10.3 | 9.3 | 9.6 | 10.1 | 8.7 | 7.7 | 6.9 | 6.3 | 6.9 | 8.3 | 9.6 | 9.7 | 8.9 | 37 |
| West Northwest | 9.9 | 9.5 | 9.8 | 10.0 | 8.9 | 8.2 | 6.9 | 6.5 | 7.1 | 8.5 | 9.5 | 9.6 | 8.9 | 37 |
| Northwest | 10.6 | 10.7 | 10.4 | 11.4 | 9.0 | 8.4 | 7.6 | 7.4 | 8.4 | 9.2 | 10.4 | 9.6 | 9.6 | 37 |
| North Northwest | 11.7 | 11.2 | 11.3 | 11.3 | 9.9 | 8.4 | 7.4 | 8.2 | 9.0 | 10.0 | 11.0 | 10.8 | 10.3 | 37 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 12 | 11 | 12 | 10 | 10 | 8 | 9 | 12 | 11 | 11 | 12 | 13 | 131 | 37 |
| Percent Obs with Visibility <= 1/2 mile | 0.94 | 1.19 | 1.26 | 0.50 | 0.56 | 0.22 | 0.16 | 0.27 | 0.21 | 0.31 | 0.56 | 0.78 | 0.58 | 37 |

## CLIMATOLOGICAL TABLE

### MILWAUKEE, WI (42°57'N,087°54'W) Elevation 672 feet (204.8 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1018.9 | 1018.8 | 1016.4 | 1015.1 | 1015.2 | 1014.4 | 1015.6 | 1016.4 | 1017.3 | 1017.4 | 1016.6 | 1018.3 | 1016.7 | 48 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 20.3 | 24.2 | 33.4 | 45.2 | 55.5 | 65.9 | 71.5 | 70.2 | 62.4 | 51.3 | 37.9 | 25.8 | 47.1 | 48 |
| Mean Daily Maximum | 27.3 | 31.1 | 40.5 | 53.7 | 65.2 | 75.7 | 80.4 | 78.8 | 71.1 | 59.9 | 45.0 | 32.4 | 55.2 | 48 |
| Mean Daily Minimum | 12.6 | 16.7 | 25.8 | 36.2 | 45.3 | 55.6 | 62.1 | 61.3 | 53.2 | 42.2 | 30.3 | 18.7 | 38.5 | 48 |
| Extreme Highest | 60 | 65 | 82 | 91 | 93 | 101 | 103 | 103 | 98 | 89 | 77 | 63 | 103 | 48 |
| Extreme Lowest | -26 | -19 | -10 | 12 | 21 | 36 | 40 | 44 | 28 | 18 | -5 | -20 | -26 | 48 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 73.2 | 72.5 | 71.7 | 68.4 | 67.8 | 69.7 | 71.8 | 74.6 | 73.9 | 71.8 | 74.0 | 75.5 | 72.1 | 48 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 24.2 | 23.8 | 20.9 | 22.2 | 24.2 | 23.9 | 26.4 | 28.0 | 29.0 | 28.8 | 19.1 | 20.9 | 24.3 | 48 |
| Percent of time Scattered | 10.9 | 12.3 | 14.3 | 13.9 | 18.3 | 22.5 | 24.1 | 23.5 | 19.8 | 16.5 | 12.1 | 10.9 | 16.6 | 48 |
| Percent of time Broken | 11.0 | 11.9 | 13.1 | 14.3 | 18.1 | 20.5 | 21.0 | 19.5 | 17.3 | 15.6 | 13.8 | 10.6 | 15.6 | 48 |
| Percent of time Overcast | 53.9 | 52.0 | 51.6 | 49.7 | 39.4 | 33.1 | 28.5 | 29.1 | 33.8 | 39.1 | 55.0 | 57.7 | 43.6 | 48 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 1.67 | 1.44 | 2.58 | 3.38 | 2.80 | 3.39 | 3.61 | 3.47 | 2.94 | 2.40 | 2.45 | 2.11 | 32.23 | 48 |
| Greatest Amount (inches) | 4.04 | 3.94 | 6.93 | 7.31 | 7.56 | 8.28 | 7.66 | 9.05 | 9.41 | 7.03 | 7.11 | 5.42 | 42.17 | 48 |
| Least Amount (inches) | 0.31 | 0.05 | 0.31 | 1.31 | 0.50 | 0.70 | 1.02 | 0.46 | 0.02 | 0.15 | 0.58 | 0.29 | 19.10 | 48 |
| Maximum in 24 hrs. (inches) | 1.54 | 1.67 | 2.31 | 3.01 | 2.15 | 3.04 | 3.04 | 6.81 | 2.52 | 2.33 | 1.82 | 2.24 | 6.81 | 48 |
| Mean Number of Days with Precipitation | 20 | 17 | 18 | 18 | 16 | 15 | 15 | 14 | 14 | 14 | 17 | 20 | 198 | 48 |
| Mean Snowfall Amount (inches) | 13.3 | 10.5 | 9.0 | 2.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 3.2 | 10.7 | 49.1 | 48 |
| Greatest Snowfall Amount (inches) | 33.6 | 42.0 | 26.7 | 15.8 | 3.2 | 0.0 | 0.0 | 0.0 | 0.0 | 6.3 | 16.1 | 27.9 | 88.1 | 48 |
| Least Snowfall Amount (inches) | 0.2 | T | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 0.6 | 21.6 | 48 |
| Maximum Snowfall in 24 hrs. (inches) | 13.8 | 16.7 | 11.2 | 11.6 | 3.2 | 0.0 | 0.0 | 0.0 | 0.0 | 3.7 | 9.8 | 13.1 | 16.7 | 48 |
| Mean Number of Days with Snow | 18 | 15 | 13 | 5 | Miss | 0 | 0 | 0 | 0 | 1 | 9 | 16 | 77 | 48 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.06 | 0.09 | 0.08 | 0.03 | 0.10 | 0.00 | 0.02 | 0.02 | 0.00 | 0.01 | 0.13 | 0.06 | 0.31 | 48 |
| Mean Wind Speed (Knots) | 10.8 | 10.6 | 11.0 | 11.0 | 9.9 | 9.0 | 8.4 | 8.2 | 8.9 | 9.8 | 10.7 | 10.5 | 9.9 | 48 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 3.4 | 5.2 | 5.6 | 7.5 | 7.1 | 5.9 | 4.9 | 4.6 | 4.8 | 4.4 | 3.7 | 3.3 | 5.0 | 48 |
| North Northeast | 2.5 | 4.7 | 9.0 | 12.0 | 15.2 | 12.3 | 8.9 | 7.9 | 5.6 | 5.0 | 3.5 | 1.9 | 7.4 | 48 |
| Northeast | 2.3 | 4.1 | 5.6 | 6.7 | 7.1 | 6.0 | 5.8 | 5.2 | 4.2 | 3.6 | 2.5 | 2.1 | 4.6 | 48 |
| East Northeast | 1.6 | 3.2 | 4.4 | 3.9 | 2.9 | 2.6 | 2.8 | 3.0 | 2.6 | 2.0 | 1.8 | 1.5 | 2.7 | 48 |
| East | 1.7 | 3.0 | 4.2 | 4.2 | 3.5 | 3.2 | 3.7 | 3.5 | 3.2 | 2.3 | 1.7 | 2.1 | 3.0 | 48 |
| East Southeast | 1.6 | 2.4 | 4.2 | 4.4 | 4.7 | 4.8 | 5.0 | 4.3 | 3.9 | 2.9 | 2.1 | 1.9 | 3.5 | 48 |
| Southeast | 2.7 | 2.6 | 5.0 | 7.0 | 8.4 | 7.8 | 7.2 | 6.5 | 5.8 | 5.1 | 3.0 | 2.9 | 5.4 | 48 |
| South Southeast | 3.3 | 3.0 | 4.6 | 5.4 | 5.6 | 5.5 | 5.5 | 5.1 | 6.3 | 6.1 | 4.8 | 3.7 | 4.9 | 48 |
| South | 6.1 | 5.5 | 5.2 | 5.6 | 5.9 | 7.1 | 7.1 | 7.4 | 8.5 | 8.7 | 7.8 | 6.9 | 6.8 | 48 |
| South Southwest | 7.7 | 6.9 | 5.5 | 6.2 | 6.4 | 8.2 | 8.8 | 9.7 | 10.0 | 10.6 | 9.4 | 8.3 | 8.2 | 48 |
| Southwest | 9.3 | 8.8 | 6.4 | 6.1 | 7.5 | 9.0 | 10.3 | 11.4 | 9.5 | 10.2 | 10.5 | 10.1 | 9.1 | 48 |
| West Southwest | 11.4 | 8.7 | 7.0 | 6.0 | 6.8 | 8.0 | 8.3 | 8.6 | 7.7 | 8.3 | 10.6 | 10.9 | 8.5 | 48 |
| West | 12.9 | 9.5 | 7.3 | 6.2 | 5.7 | 6.4 | 6.5 | 6.7 | 6.9 | 8.5 | 10.0 | 11.4 | 8.2 | 48 |
| West Northwest | 15.9 | 13.3 | 9.9 | 7.3 | 5.3 | 5.3 | 6.2 | 5.8 | 7.9 | 9.1 | 12.1 | 15.8 | 9.5 | 48 |
| Northwest | 10.1 | 9.9 | 8.0 | 5.2 | 3.1 | 3.2 | 3.7 | 4.2 | 5.8 | 6.3 | 8.3 | 10.0 | 6.5 | 48 |
| North Northwest | 6.8 | 7.6 | 6.3 | 4.4 | 2.7 | 2.5 | 2.3 | 3.2 | 4.3 | 4.8 | 6.5 | 6.2 | 4.8 | 48 |
| Calm | 1.4 | 1.8 | 2.1 | 2.1 | 2.3 | 2.4 | 3.1 | 3.2 | 2.9 | 2.5 | 1.8 | 1.5 | 2.3 | 48 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 10.9 | 11.5 | 12.3 | 12.6 | 11.1 | 9.7 | 9.1 | 9.0 | 9.8 | 11.0 | 10.8 | 10.9 | 10.8 | 48 |
| North Northeast | 11.8 | 12.1 | 12.5 | 12.4 | 11.5 | 9.9 | 9.6 | 10.1 | 10.4 | 11.0 | 12.0 | 12.1 | 11.2 | 48 |
| Northeast | 13.4 | 12.2 | 11.6 | 10.4 | 8.8 | 8.2 | 8.5 | 9.0 | 9.6 | 10.0 | 12.0 | 12.7 | 10.1 | 48 |
| East Northeast | 11.8 | 12.2 | 11.5 | 10.5 | 8.5 | 7.7 | 7.9 | 8.0 | 8.7 | 8.7 | 11.4 | 12.7 | 9.9 | 48 |
| East | 9.8 | 10.0 | 10.8 | 9.5 | 7.6 | 6.9 | 7.2 | 6.7 | 7.8 | 8.4 | 9.6 | 10.2 | 8.6 | 48 |
| East Southeast | 11.2 | 10.3 | 10.3 | 9.9 | 8.7 | 7.9 | 8.2 | 8.6 | 8.6 | 9.4 | 10.5 | 10.7 | 9.2 | 48 |
| Southeast | 11.6 | 11.0 | 11.0 | 10.6 | 9.7 | 9.0 | 9.0 | 8.8 | 9.3 | 10.1 | 11.1 | 11.5 | 9.9 | 48 |
| South Southeast | 10.0 | 9.9 | 10.0 | 9.7 | 8.3 | 8.0 | 7.3 | 7.5 | 8.1 | 9.2 | 9.2 | 9.5 | 8.8 | 48 |
| South | 9.7 | 9.2 | 8.8 | 8.5 | 8.3 | 7.8 | 7.3 | 7.0 | 8.2 | 9.0 | 9.3 | 9.4 | 8.5 | 48 |
| South Southwest | 11.0 | 10.6 | 11.4 | 11.1 | 10.7 | 9.6 | 8.9 | 8.4 | 9.5 | 10.4 | 10.9 | 10.3 | 10.1 | 48 |
| Southwest | 11.0 | 11.1 | 12.9 | 12.7 | 11.6 | 10.5 | 9.4 | 8.9 | 9.9 | 10.9 | 11.4 | 11.3 | 10.8 | 48 |
| West Southwest | 11.0 | 10.6 | 11.6 | 12.8 | 11.9 | 10.3 | 9.2 | 8.4 | 9.5 | 10.3 | 11.6 | 10.8 | 10.6 | 48 |
| West | 10.6 | 9.9 | 10.2 | 11.0 | 10.2 | 9.3 | 8.5 | 7.6 | 8.1 | 9.3 | 10.7 | 10.4 | 9.8 | 48 |
| West Northwest | 11.1 | 10.7 | 10.9 | 11.7 | 10.6 | 10.2 | 9.1 | 8.5 | 9.2 | 10.4 | 11.3 | 10.8 | 10.6 | 48 |
| Northwest | 10.7 | 10.9 | 11.2 | 12.0 | 10.6 | 9.8 | 9.2 | 8.8 | 9.3 | 10.5 | 11.0 | 10.2 | 10.5 | 48 |
| North Northwest | 10.8 | 11.3 | 11.3 | 11.5 | 9.6 | 8.7 | 8.0 | 8.4 | 9.7 | 10.5 | 10.9 | 10.7 | 10.5 | 48 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 11 | 11 | 12 | 11 | 11 | 10 | 10 | 13 | 12 | 11 | 12 | 13 | 137 | 48 |
| Percent Obs with Visibility <= 1/2 mile | 1.67 | 1.53 | 2.35 | 1.94 | 1.70 | 0.98 | 0.52 | 0.55 | 0.48 | 1.05 | 1.18 | 1.47 | 1.29 | 48 |

## CLIMATOLOGICAL TABLE

### GREEN BAY, WI (44°29'N,088°08'W) Elevation 682 feet (207.9 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1018.5 | 1018.7 | 1016.6 | 1015.0 | 1014.9 | 1014.0 | 1015.2 | 1016.1 | 1016.9 | 1016.8 | 1016.3 | 1018.1 | 1016.4 | 46 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 15.3 | 19.1 | 29.7 | 43.9 | 55.7 | 65.2 | 70.0 | 67.9 | 59.1 | 48.5 | 34.3 | 21.2 | 44.3 | 46 |
| Mean Daily Maximum | 23.4 | 27.5 | 37.9 | 53.7 | 67.0 | 76.4 | 81.0 | 78.5 | 69.6 | 58.1 | 41.8 | 28.5 | 53.7 | 46 |
| Mean Daily Minimum | 6.5 | 10.0 | 21.1 | 33.7 | 43.8 | 53.4 | 58.5 | 56.7 | 48.2 | 38.3 | 26.3 | 13.3 | 34.3 | 46 |
| Extreme Highest | 50 | 55 | 77 | 89 | 91 | 98 | 103 | 99 | 95 | 88 | 72 | 62 | 103 | 46 |
| Extreme Lowest | -31 | -26 | -29 | 7 | 21 | 32 | 40 | 38 | 24 | 15 | -9 | -27 | -31 | 46 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 74.4 | 73.7 | 73.1 | 67.8 | 66.6 | 69.8 | 72.2 | 75.6 | 76.1 | 74.3 | 76.3 | 77.1 | 73.1 | 46 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 25.3 | 25.8 | 23.2 | 21.5 | 22.2 | 22.6 | 23.6 | 24.8 | 25.4 | 24.3 | 18.2 | 21.2 | 23.2 | 46 |
| Percent of time Scattered | 12.4 | 14.2 | 15.2 | 15.3 | 19.7 | 22.7 | 25.6 | 23.8 | 20.0 | 17.2 | 12.9 | 12.1 | 17.6 | 46 |
| Percent of time Broken | 11.2 | 12.5 | 13.9 | 15.8 | 19.9 | 22.3 | 22.9 | 20.1 | 18.6 | 16.4 | 13.6 | 11.0 | 16.5 | 46 |
| Percent of time Overcast | 51.1 | 47.6 | 47.7 | 47.4 | 38.2 | 32.4 | 27.9 | 31.3 | 36.0 | 42.1 | 55.3 | 55.6 | 42.7 | 46 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 1.10 | 1.02 | 1.91 | 2.72 | 2.88 | 3.17 | 3.45 | 3.32 | 3.21 | 2.23 | 2.07 | 1.40 | 28.49 | 46 |
| Greatest Amount (inches) | 2.64 | 3.56 | 4.68 | 5.91 | 8.21 | 10.29 | 7.00 | 9.04 | 7.80 | 5.00 | 5.32 | 3.15 | 38.36 | 46 |
| Least Amount (inches) | 0.12 | 0.04 | 0.31 | 0.49 | 0.06 | 0.31 | 0.83 | 0.90 | 0.28 | T | 0.16 | 0.10 | 17.85 | 46 |
| Maximum in 24 hrs. (inches) | 0.98 | 1.78 | 1.25 | 1.86 | 2.22 | 4.90 | 2.95 | 3.83 | 2.99 | 3.44 | 2.23 | 1.16 | 4.90 | 46 |
| Mean Number of Days with Precipitation | 19 | 16 | 17 | 16 | 15 | 14 | 14 | 15 | 14 | 14 | 16 | 19 | 189 | 46 |
| Mean Snowfall Amount (inches) | 10.9 | 8.4 | 8.9 | 2.4 | 0.2 | 0.0 | 0.0 | 0.0 | T | 0.2 | 4.9 | 10.8 | 46.6 | 46 |
| Greatest Snowfall Amount (inches) | 30.0 | 20.6 | 24.2 | 11.8 | 4.3 | 0.0 | 0.0 | 0.0 | T | 1.7 | 17.1 | 27.0 | 92.0 | 46 |
| Least Snowfall Amount (inches) | 1.5 | 0.5 | T | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | T | 0.7 | 17.5 | 46 |
| Maximum Snowfall in 24 hrs. (inches) | 8.8 | 9.0 | 12.7 | 9.8 | 4.3 | 0.0 | 0.0 | 0.0 | T | 1.3 | 9.7 | 14.4 | 12.7 | 46 |
| Mean Number of Days with Snow | 18 | 15 | 12 | 6 | Miss | 0 | 0 | 0 | Miss | 2 | 10 | 17 | 80 | 46 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.07 | 0.02 | 0.02 | 0.03 | 0.06 | 0.03 | 0.01 | 0.00 | 0.00 | 0.02 | 0.09 | 0.01 | 0.35 | 46 |
| Mean Wind Speed (Knots) | 9.4 | 9.1 | 9.3 | 9.7 | 8.7 | 7.9 | 7.1 | 6.8 | 7.7 | 8.6 | 9.4 | 9.1 | 8.6 | 46 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 5.0 | 5.6 | 5.8 | 5.0 | 4.2 | 4.0 | 4.3 | 5.4 | 5.7 | 5.4 | 6.0 | 5.2 | 5.1 | 46 |
| North Northeast | 4.8 | 7.2 | 7.6 | 8.6 | 6.4 | 4.8 | 4.6 | 5.1 | 4.8 | 5.0 | 5.4 | 5.1 | 5.8 | 46 |
| Northeast | 5.6 | 9.2 | 12.1 | 12.0 | 10.3 | 7.2 | 5.6 | 5.5 | 4.1 | 4.5 | 3.9 | 4.5 | 7.0 | 46 |
| East Northeast | 2.2 | 3.3 | 5.5 | 6.4 | 6.7 | 5.0 | 3.9 | 4.2 | 2.8 | 3.0 | 2.6 | 2.1 | 4.0 | 46 |
| East | 2.0 | 2.3 | 4.1 | 5.5 | 5.7 | 4.9 | 4.2 | 3.9 | 3.4 | 3.4 | 2.5 | 2.7 | 3.7 | 46 |
| East Southeast | 1.3 | 1.1 | 2.2 | 3.0 | 4.2 | 3.6 | 2.8 | 2.4 | 2.4 | 2.0 | 1.6 | 1.4 | 2.3 | 46 |
| Southeast | 1.6 | 1.3 | 3.1 | 3.8 | 5.0 | 4.6 | 3.1 | 3.2 | 3.1 | 3.1 | 2.4 | 1.5 | 3.0 | 46 |
| South Southeast | 1.9 | 2.1 | 4.0 | 4.3 | 5.5 | 5.2 | 4.1 | 4.6 | 4.8 | 4.5 | 3.5 | 2.3 | 3.9 | 46 |
| South | 4.2 | 3.8 | 4.6 | 5.2 | 5.7 | 7.0 | 7.1 | 7.0 | 7.4 | 7.2 | 5.4 | 4.8 | 5.8 | 46 |
| South Southwest | 8.8 | 9.2 | 7.3 | 7.4 | 8.1 | 9.8 | 10.5 | 10.3 | 11.4 | 11.2 | 9.5 | 9.1 | 9.4 | 46 |
| Southwest | 11.8 | 10.5 | 7.0 | 6.9 | 8.5 | 10.1 | 11.9 | 11.9 | 11.0 | 12.0 | 10.7 | 11.3 | 10.3 | 46 |
| West Southwest | 8.5 | 6.9 | 4.8 | 4.2 | 4.7 | 6.5 | 6.8 | 6.5 | 6.2 | 6.4 | 7.1 | 8.2 | 6.4 | 46 |
| West | 15.1 | 11.0 | 9.0 | 7.2 | 6.5 | 8.5 | 9.0 | 7.4 | 9.0 | 9.0 | 11.8 | 13.5 | 9.8 | 46 |
| West Northwest | 10.8 | 8.4 | 6.7 | 6.0 | 5.4 | 5.4 | 5.9 | 5.5 | 6.5 | 7.0 | 9.8 | 11.4 | 7.4 | 46 |
| Northwest | 7.8 | 7.3 | 6.4 | 6.4 | 4.4 | 4.7 | 5.4 | 5.3 | 6.3 | 6.7 | 8.0 | 7.8 | 6.4 | 46 |
| North Northwest | 6.2 | 7.4 | 6.6 | 5.9 | 4.6 | 3.9 | 4.2 | 5.2 | 5.5 | 5.6 | 7.0 | 6.2 | 5.7 | 46 |
| Calm | 3.3 | 3.9 | 3.6 | 2.8 | 4.8 | 5.1 | 6.8 | 7.3 | 5.8 | 4.3 | 3.5 | 3.4 | 4.6 | 46 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 8.7 | 9.1 | 9.6 | 9.0 | 8.0 | 7.6 | 6.8 | 6.9 | 7.4 | 8.3 | 9.2 | 8.9 | 8.4 | 46 |
| North Northeast | 9.4 | 9.8 | 10.2 | 10.2 | 9.4 | 8.5 | 7.8 | 7.8 | 8.4 | 8.9 | 9.8 | 9.5 | 9.3 | 46 |
| Northeast | 9.8 | 10.4 | 10.4 | 10.6 | 10.0 | 8.8 | 8.0 | 7.9 | 8.1 | 8.8 | 9.6 | 9.4 | 9.6 | 46 |
| East Northeast | 8.2 | 8.5 | 9.3 | 9.4 | 8.7 | 7.3 | 7.1 | 6.9 | 7.7 | 7.5 | 9.2 | 8.5 | 8.3 | 46 |
| East | 6.4 | 7.3 | 8.5 | 8.5 | 6.9 | 6.3 | 6.1 | 5.6 | 6.4 | 6.3 | 6.9 | 7.5 | 6.9 | 46 |
| East Southeast | 9.1 | 8.5 | 8.3 | 9.2 | 7.8 | 7.2 | 6.8 | 6.5 | 6.8 | 8.0 | 8.2 | 8.4 | 7.8 | 46 |
| Southeast | 8.9 | 8.7 | 8.8 | 9.7 | 8.7 | 7.6 | 7.0 | 6.9 | 7.9 | 8.8 | 9.1 | 9.1 | 8.3 | 46 |
| South Southeast | 9.1 | 8.4 | 8.7 | 9.2 | 8.8 | 8.1 | 7.2 | 7.3 | 8.0 | 8.7 | 8.9 | 8.3 | 8.3 | 46 |
| South | 8.2 | 7.5 | 8.1 | 8.6 | 8.3 | 7.5 | 6.8 | 6.9 | 7.6 | 8.3 | 8.2 | 8.0 | 7.8 | 46 |
| South Southwest | 9.8 | 9.8 | 9.4 | 10.2 | 9.6 | 8.9 | 8.5 | 8.0 | 9.0 | 9.8 | 9.9 | 9.8 | 9.3 | 46 |
| Southwest | 10.1 | 9.7 | 9.6 | 10.9 | 10.2 | 9.2 | 8.2 | 8.0 | 9.3 | 9.6 | 10.7 | 9.9 | 9.5 | 46 |
| West Southwest | 9.1 | 8.6 | 9.5 | 10.2 | 9.3 | 8.8 | 7.6 | 7.4 | 8.1 | 8.8 | 9.4 | 9.0 | 8.8 | 46 |
| West | 9.9 | 9.1 | 9.7 | 9.9 | 9.2 | 8.4 | 7.5 | 6.8 | 7.8 | 8.9 | 9.7 | 9.4 | 8.9 | 46 |
| West Northwest | 10.9 | 10.4 | 10.2 | 11.3 | 10.8 | 9.4 | 8.5 | 7.7 | 8.8 | 9.6 | 11.0 | 10.3 | 10.0 | 46 |
| Northwest | 10.2 | 10.1 | 10.6 | 11.0 | 9.6 | 8.6 | 7.7 | 7.4 | 8.3 | 9.7 | 10.3 | 9.5 | 9.5 | 46 |
| North Northwest | 9.9 | 9.9 | 9.9 | 10.0 | 8.7 | 8.2 | 7.2 | 6.8 | 7.9 | 8.9 | 9.9 | 9.3 | 9.0 | 46 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 9 | 10 | 11 | 10 | 9 | 9 | 11 | 14 | 12 | 11 | 12 | 11 | 129 | 46 |
| Percent Obs with Visibility <= 1/2 mile | 1.31 | 1.51 | 2.06 | 1.18 | 0.53 | 0.47 | 0.31 | 0.94 | 0.83 | 1.05 | 1.18 | 1.92 | 1.11 | 46 |

## CLIMATOLOGICAL TABLE

### SAULT STE. MARIE (46°28'N,084°22'W) Elevation 724 feet (221.6 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1016.7 | 1017.7 | 1016.7 | 1015.1 | 1015.2 | 1014.1 | 1015.0 | 1016.2 | 1016.7 | 1016.9 | 1014.9 | 1016.4 | 1016.0 | 48 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 13.9 | 15.1 | 24.3 | 38.4 | 50.2 | 58.5 | 64.0 | 63.3 | 55.0 | 45.5 | 32.7 | 20.2 | 40.2 | 49 |
| Mean Daily Maximum | 21.8 | 23.7 | 32.8 | 47.4 | 61.5 | 70.3 | 75.5 | 73.8 | 64.5 | 53.7 | 38.9 | 26.9 | 49.4 | 49 |
| Mean Daily Minimum | 5.4 | 5.8 | 15.4 | 28.9 | 38.4 | 46.3 | 51.9 | 52.4 | 45.0 | 36.7 | 26.0 | 13.0 | 30.6 | 49 |
| Extreme Highest | 45 | 47 | 62 | 85 | 89 | 93 | 97 | 98 | 95 | 80 | 67 | 60 | 98 | 49 |
| Extreme Lowest | -36 | -35 | -22 | -2 | 18 | 26 | 36 | 29 | 25 | 16 | -10 | -31 | -36 | 49 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 42.2 | 52.2 | 42.2 | 26.0 | 27.2 | 15.8 | 24.7 | 37.0 | 42.5 | 44.0 | 23.6 | 39.4 | 34.7 | 48 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 11.8 | 17.1 | 22.2 | 21.9 | 23.1 | 21.5 | 22.2 | 22.7 | 16.1 | 15.9 | 7.9 | 9.1 | 17.6 | 48 |
| Percent of time Scattered | 11.3 | 13.1 | 14.4 | 14.8 | 17.9 | 20.5 | 23.8 | 22.1 | 18.3 | 15.3 | 9.5 | 10.1 | 15.9 | 48 |
| Percent of time Broken | 12.3 | 13.2 | 12.7 | 13.9 | 17.1 | 19.0 | 20.7 | 19.2 | 20.4 | 17.3 | 13.8 | 12.2 | 16.0 | 48 |
| Percent of time Overcast | 64.6 | 56.5 | 50.7 | 49.4 | 41.9 | 38.9 | 33.3 | 36.0 | 45.1 | 51.5 | 68.8 | 68.5 | 50.4 | 48 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 2.26 | 1.56 | 2.08 | 2.48 | 2.65 | 3.17 | 2.88 | 3.33 | 3.75 | 3.12 | 3.38 | 2.70 | 33.35 | 49 |
| Greatest Amount (inches) | 4.52 | 3.74 | 4.97 | 5.16 | 5.32 | 7.35 | 6.04 | 9.48 | 7.78 | 6.55 | 7.72 | 6.24 | 45.84 | 49 |
| Least Amount (inches) | 0.51 | 0.21 | 0.35 | 0.60 | 0.80 | 0.52 | 0.57 | 0.50 | 1.05 | 0.16 | 0.87 | 0.58 | 25.51 | 49 |
| Maximum in 24 hrs. (inches) | 1.21 | 1.00 | 1.38 | 2.35 | 2.34 | 2.39 | 2.23 | 5.92 | 2.20 | 1.86 | 2.33 | 1.46 | 5.92 | 49 |
| Mean Number of Days with Precipitation | 26 | 22 | 19 | 16 | 15 | 16 | 15 | 16 | 18 | 19 | 23 | 26 | 231 | 48 |
| Mean Snowfall Amount (inches) | 30.2 | 18.9 | 14.6 | 5.7 | 0.4 | 0.0 | 0.0 | 0.0 | 0.1 | 2.3 | 15.5 | 31.2 | 119.1 | 48 |
| Greatest Snowfall Amount (inches) | 71.0 | 39.5 | 34.7 | 25.8 | 4.5 | 0.0 | 0.0 | 0.0 | 2.7 | 11.6 | 46.8 | 98.7 | 208.8 | 48 |
| Least Snowfall Amount (inches) | 8.3 | 2.8 | 0.2 | T | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.6 | 5.1 | 60.4 | 48 |
| Maximum Snowfall in 24 hrs. (inches) | 15.3 | 12.4 | 11.8 | 9.0 | 2.7 | 0.0 | 0.0 | 0.0 | 2.7 | 7.0 | 10.5 | 26.6 | 15.3 | 48 |
| Mean Number of Days with Snow | 26 | 21 | 17 | 9 | 2 | 0 | 0 | 0 | 1 | 6 | 18 | 25 | 125 | 48 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.03 | 0.02 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.03 | 0.01 | 0.49 | 48 |
| Mean Wind Speed (Knots) | 8.2 | 7.9 | 8.4 | 8.7 | 8.2 | 7.3 | 6.6 | 6.5 | 7.2 | 7.8 | 8.4 | 8.1 | 7.8 | 48 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 4.9 | 4.2 | 3.8 | 3.7 | 2.4 | 1.8 | 1.8 | 2.6 | 3.2 | 4.2 | 5.2 | 5.4 | 3.6 | 48 |
| North Northeast | 2.8 | 2.9 | 2.6 | 2.7 | 1.6 | 1.1 | 0.9 | 1.4 | 2.1 | 3.1 | 3.6 | 3.4 | 2.4 | 48 |
| Northeast | 3.6 | 3.5 | 3.6 | 3.2 | 3.0 | 2.1 | 2.0 | 2.7 | 3.0 | 3.0 | 3.6 | 3.6 | 3.1 | 48 |
| East Northeast | 5.6 | 5.5 | 5.7 | 5.5 | 4.9 | 4.1 | 3.7 | 5.2 | 5.4 | 5.2 | 5.6 | 6.6 | 5.3 | 48 |
| East | 12.6 | 10.7 | 10.5 | 9.8 | 8.6 | 8.8 | 6.9 | 8.1 | 8.6 | 9.6 | 9.2 | 12.2 | 9.6 | 48 |
| East Southeast | 12.0 | 11.3 | 13.0 | 12.8 | 12.4 | 10.3 | 7.1 | 8.3 | 10.1 | 11.9 | 11.0 | 11.1 | 11.0 | 48 |
| Southeast | 7.1 | 6.0 | 6.7 | 7.2 | 7.9 | 8.8 | 7.1 | 6.9 | 9.2 | 9.9 | 9.6 | 7.9 | 7.9 | 48 |
| South Southeast | 3.2 | 2.6 | 2.6 | 2.3 | 2.8 | 3.4 | 3.3 | 3.3 | 3.9 | 4.0 | 4.2 | 4.3 | 3.3 | 48 |
| South | 3.6 | 3.2 | 3.0 | 2.4 | 2.6 | 3.0 | 3.6 | 3.6 | 3.9 | 4.1 | 4.3 | 4.3 | 3.5 | 48 |
| South Southwest | 2.2 | 2.5 | 2.3 | 2.2 | 2.4 | 3.2 | 3.7 | 3.0 | 3.6 | 3.5 | 2.8 | 2.1 | 2.8 | 48 |
| Southwest | 4.7 | 4.1 | 3.1 | 3.6 | 4.4 | 5.5 | 6.5 | 6.6 | 6.3 | 5.5 | 5.5 | 5.7 | 5.1 | 48 |
| West Southwest | 7.7 | 4.5 | 3.1 | 3.0 | 3.3 | 4.0 | 4.5 | 4.3 | 4.0 | 4.5 | 6.6 | 8.0 | 4.8 | 48 |
| West | 5.5 | 6.8 | 5.2 | 5.7 | 6.6 | 6.9 | 7.7 | 5.9 | 4.8 | 4.5 | 5.4 | 5.3 | 5.8 | 48 |
| West Northwest | 6.7 | 10.6 | 12.6 | 14.2 | 17.2 | 16.8 | 18.4 | 14.1 | 10.9 | 9.5 | 7.4 | 5.6 | 12.0 | 48 |
| Northwest | 9.2 | 12.9 | 14.0 | 15.3 | 14.6 | 14.1 | 14.3 | 14.3 | 12.3 | 10.2 | 8.3 | 6.4 | 12.1 | 48 |
| North Northwest | 5.1 | 4.3 | 4.3 | 3.6 | 2.4 | 2.4 | 2.3 | 3.2 | 4.1 | 4.2 | 5.3 | 4.6 | 3.8 | 48 |
| Calm | 3.7 | 4.4 | 4.1 | 3.2 | 3.6 | 4.3 | 6.4 | 7.2 | 5.2 | 3.8 | 2.8 | 3.2 | 4.3 | 48 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 8.1 | 8.1 | 8.1 | 7.8 | 7.1 | 6.4 | 5.2 | 5.9 | 6.5 | 7.8 | 8.2 | 8.2 | 7.6 | 48 |
| North Northeast | 8.3 | 8.5 | 9.3 | 8.5 | 8.3 | 7.4 | 7.1 | 6.8 | 7.2 | 7.4 | 8.2 | 8.0 | 8.1 | 48 |
| Northeast | 6.6 | 7.6 | 8.1 | 8.4 | 7.5 | 6.3 | 5.6 | 5.9 | 6.2 | 6.7 | 7.5 | 7.1 | 7.1 | 48 |
| East Northeast | 6.4 | 6.8 | 7.0 | 7.4 | 6.7 | 6.0 | 5.3 | 5.2 | 5.6 | 5.8 | 6.8 | 6.8 | 6.4 | 48 |
| East | 7.0 | 6.7 | 7.8 | 7.4 | 6.4 | 5.7 | 5.1 | 5.1 | 5.7 | 6.0 | 6.0 | 7.1 | 6.5 | 48 |
| East Southeast | 8.3 | 8.2 | 9.6 | 9.6 | 8.5 | 7.3 | 6.3 | 6.4 | 7.2 | 7.8 | 8.3 | 8.3 | 8.1 | 48 |
| Southeast | 7.4 | 7.4 | 8.2 | 9.2 | 8.8 | 7.8 | 6.8 | 6.9 | 7.6 | 8.1 | 8.1 | 7.6 | 7.8 | 48 |
| South Southeast | 7.5 | 6.2 | 6.5 | 7.4 | 7.9 | 7.0 | 6.6 | 6.3 | 6.9 | 7.4 | 7.5 | 7.5 | 7.1 | 48 |
| South | 6.1 | 5.5 | 5.6 | 6.1 | 6.4 | 5.8 | 6.0 | 5.4 | 6.0 | 6.4 | 6.5 | 6.0 | 6.0 | 48 |
| South Southwest | 7.1 | 8.0 | 8.5 | 8.8 | 8.7 | 8.0 | 7.1 | 7.1 | 7.4 | 8.0 | 7.3 | 6.8 | 7.7 | 48 |
| Southwest | 9.1 | 8.5 | 8.6 | 9.0 | 9.3 | 8.5 | 7.5 | 7.5 | 8.5 | 8.1 | 8.6 | 8.6 | 8.4 | 48 |
| West Southwest | 9.8 | 8.1 | 7.4 | 7.5 | 6.9 | 6.7 | 6.3 | 6.6 | 7.2 | 8.6 | 9.1 | 9.3 | 8.1 | 48 |
| West | 9.5 | 8.2 | 7.3 | 7.1 | 6.5 | 6.2 | 6.1 | 5.6 | 6.6 | 7.9 | 9.3 | 9.5 | 7.4 | 48 |
| West Northwest | 11.7 | 10.1 | 10.3 | 10.2 | 9.7 | 8.7 | 8.3 | 8.2 | 9.6 | 10.5 | 12.0 | 12.4 | 9.8 | 48 |
| Northwest | 11.1 | 10.5 | 10.9 | 11.1 | 10.7 | 9.4 | 8.9 | 8.9 | 9.6 | 10.6 | 11.5 | 11.1 | 10.2 | 48 |
| North Northwest | 9.8 | 9.5 | 9.3 | 9.0 | 8.5 | 7.5 | 7.2 | 7.2 | 8.2 | 8.8 | 9.9 | 9.9 | 8.9 | 48 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number Of Days with Fog | 8 | 7 | 11 | 10 | 10 | 14 | 15 | 18 | 18 | 15 | 12 | 11 | 149 | 48 |
| Percent Obs with Visibility <= 1/2 mile | 2.12 | 1.54 | 2.50 | 1.95 | 1.21 | 1.37 | 1.80 | 2.22 | 2.53 | 2.45 | 1.87 | 2.16 | 1.98 | 48 |

## CLIMATOLOGICAL TABLE

### DULUTH, MN (46°50'N,092°11'W) Elevation 1,428 feet (435.3 m)

| WEATHER ELEMENTS | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | YEAR | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEA LEVEL PRESSURE | | | | | | | | | | | | | | |
| Mean (Millibars) | 1018.6 | 1019.0 | 1017.0 | 1015.5 | 1015.0 | 1013.6 | 1015.0 | 1015.9 | 1016.2 | 1016.1 | 1015.9 | 1017.8 | 1016.3 | 48 |
| TEMPERATURE (DEGREES F) | | | | | | | | | | | | | | |
| Mean | 7.9 | 13.0 | 23.9 | 38.7 | 51.0 | 59.8 | 65.6 | 63.7 | 54.4 | 44.0 | 28.0 | 14.0 | 38.8 | 48 |
| Mean Daily Maximum | 16.5 | 22.1 | 32.4 | 48.0 | 61.8 | 70.7 | 76.3 | 73.9 | 63.9 | 52.5 | 34.7 | 21.5 | 48.0 | 48 |
| Mean Daily Minimum | -1.9 | 2.9 | 14.8 | 29.0 | 39.7 | 48.4 | 54.4 | 53.1 | 44.5 | 35.0 | 20.9 | 5.6 | 29.0 | 48 |
| Extreme Highest | 47 | 55 | 71 | 88 | 90 | 94 | 97 | 95 | 95 | 86 | 70 | 55 | 97 | 48 |
| Extreme Lowest | -39 | -33 | -29 | -5 | 17 | 27 | 35 | 32 | 23 | 8 | -23 | -34 | -39 | 48 |
| RELATIVE HUMIDITY | | | | | | | | | | | | | | |
| Average Percentage | 72.9 | 70.9 | 70.5 | 64.7 | 63.5 | 70.3 | 72.3 | 75.4 | 76.4 | 72.5 | 76.0 | 76.6 | 71.9 | 48 |
| CLOUD COVER | | | | | | | | | | | | | | |
| Percent of time Clear | 24.7 | 25.8 | 22.7 | 21.0 | 20.0 | 16.7 | 19.9 | 22.6 | 21.5 | 21.8 | 15.5 | 20.2 | 21.0 | 48 |
| Percent of time Scattered | 13.6 | 14.1 | 14.7 | 16.6 | 19.7 | 23.3 | 26.7 | 24.7 | 19.4 | 16.6 | 11.8 | 12.0 | 17.8 | 48 |
| Percent of time Broken | 11.8 | 11.6 | 13.2 | 16.3 | 18.4 | 21.2 | 22.7 | 19.8 | 18.2 | 15.2 | 12.5 | 11.6 | 16.1 | 48 |
| Percent of time Overcast | 49.9 | 48.5 | 49.4 | 46.2 | 41.9 | 38.8 | 30.7 | 32.9 | 40.9 | 46.4 | 60.1 | 56.2 | 45.1 | 48 |
| PRECIPITATION | | | | | | | | | | | | | | |
| Mean Amount (inches) | 1.20 | 0.82 | 1.75 | 2.41 | 3.23 | 4.08 | 3.98 | 3.95 | 3.62 | 2.39 | 1.89 | 1.27 | 30.58 | 48 |
| Greatest Amount (inches) | 4.70 | 2.37 | 5.12 | 5.84 | 7.67 | 8.04 | 8.48 | 10.31 | 9.38 | 7.53 | 5.01 | 3.70 | 43.44 | 48 |
| Least Amount (inches) | 0.14 | 0.12 | 0.22 | 0.24 | 0.15 | 0.55 | 1.09 | 0.71 | 0.19 | 0.35 | 0.19 | 0.16 | 19.84 | 48 |
| Maximum in 24 hrs. (inches) | 1.18 | 0.77 | 2.24 | 2.61 | 3.00 | 3.36 | 3.40 | 3.07 | 3.77 | 2.81 | 2.24 | 1.91 | 3.77 | 48 |
| Mean Number of Days with Precipitation | 23 | 19 | 19 | 16 | 17 | 18 | 17 | 16 | 17 | 17 | 21 | 23 | 223 | 48 |
| Mean Snowfall Amount (inches) | 17.4 | 11.3 | 13.9 | 6.9 | 0.8 | 0.0 | 0.0 | 0.0 | 0.1 | 1.7 | 12.8 | 15.9 | 80.7 | 48 |
| Greatest Snowfall Amount (inches) | 46.8 | 31.5 | 45.5 | 31.6 | 8.1 | 0.0 | 0.0 | 0.0 | 2.4 | 9.7 | 50.1 | 44.3 | 168.9 | 48 |
| Least Snowfall Amount (inches) | 2.8 | 2.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | 1.8 | 41.9 | 48 |
| Maximum Snowfall in 24 hrs. (inches) | 16.3 | 13.0 | 17.2 | 11.6 | 4.3 | 0.0 | 0.0 | 0.0 | 2.4 | 7.9 | 24.1 | 23.2 | 24.1 | 48 |
| Mean Number of Days with Snow | 23 | 19 | 17 | 10 | 3 | 0 | 0 | 0 | Miss | 6 | 18 | 23 | 119 | 48 |
| WIND | | | | | | | | | | | | | | |
| Percent of Observations with Gales (>34kts) | 0.13 | 0.23 | 0.29 | 0.26 | 0.08 | 0.03 | 0.02 | 0.00 | 0.00 | 0.05 | 0.11 | 0.11 | 0.45 | 48 |
| Mean Wind Speed (Knots) | 10.2 | 9.9 | 10.4 | 10.9 | 10.2 | 9.2 | 8.4 | 8.3 | 9.2 | 9.9 | 10.4 | 10.0 | 9.7 | 48 |
| Direction (percentage of Obs.) | | | | | | | | | | | | | | |
| North | 5.3 | 5.7 | 5.7 | 5.5 | 4.4 | 3.2 | 2.9 | 3.4 | 3.5 | 3.7 | 5.1 | 4.8 | 4.4 | 48 |
| North Northeast | 1.3 | 1.9 | 2.4 | 2.6 | 2.1 | 1.7 | 1.5 | 1.7 | 1.7 | 1.9 | 2.7 | 1.4 | 1.9 | 48 |
| Northeast | 0.8 | 1.4 | 2.1 | 2.3 | 2.0 | 1.4 | 1.2 | 1.5 | 1.4 | 1.4 | 1.5 | 1.0 | 1.5 | 48 |
| East Northeast | 1.7 | 4.0 | 7.9 | 10.0 | 8.8 | 6.2 | 3.7 | 4.6 | 4.0 | 3.6 | 3.2 | 2.3 | 5.0 | 48 |
| East | 4.4 | 7.0 | 11.8 | 14.6 | 15.9 | 12.6 | 8.9 | 9.7 | 8.5 | 8.0 | 5.5 | 4.1 | 9.3 | 48 |
| East Southeast | 5.5 | 6.4 | 8.8 | 9.7 | 13.2 | 13.3 | 10.2 | 10.8 | 9.0 | 8.9 | 5.5 | 5.3 | 8.9 | 48 |
| Southeast | 3.5 | 3.2 | 4.0 | 4.1 | 5.9 | 6.0 | 5.4 | 5.9 | 5.0 | 5.0 | 3.8 | 4.4 | 4.7 | 48 |
| South Southeast | 2.8 | 2.7 | 2.8 | 2.5 | 3.0 | 4.0 | 4.6 | 4.4 | 4.5 | 4.4 | 3.9 | 3.8 | 3.6 | 48 |
| South | 3.3 | 2.9 | 2.9 | 3.1 | 2.9 | 4.0 | 5.4 | 5.1 | 5.7 | 5.4 | 4.8 | 4.1 | 4.1 | 48 |
| South Southwest | 4.2 | 3.9 | 3.1 | 2.8 | 3.4 | 4.3 | 5.7 | 5.9 | 5.8 | 6.2 | 5.2 | 4.6 | 4.6 | 48 |
| Southwest | 6.3 | 6.3 | 4.9 | 4.8 | 4.2 | 5.0 | 6.3 | 6.9 | 6.9 | 7.1 | 6.7 | 6.9 | 6.0 | 48 |
| West Southwest | 7.4 | 7.0 | 4.5 | 4.9 | 5.2 | 7.2 | 7.1 | 6.7 | 7.4 | 6.6 | 6.9 | 7.3 | 6.5 | 48 |
| West | 9.0 | 7.7 | 6.4 | 5.2 | 5.1 | 7.1 | 8.6 | 7.2 | 8.0 | 6.8 | 8.0 | 8.2 | 7.3 | 48 |
| West Northwest | 14.8 | 13.0 | 10.3 | 7.8 | 7.1 | 8.7 | 10.6 | 9.0 | 10.6 | 11.2 | 13.6 | 14.1 | 10.9 | 48 |
| Northwest | 16.9 | 14.2 | 11.1 | 9.4 | 7.8 | 7.0 | 8.4 | 7.7 | 9.0 | 11.2 | 12.9 | 16.5 | 11.0 | 48 |
| North Northwest | 10.1 | 9.8 | 8.1 | 7.5 | 6.0 | 4.8 | 5.3 | 5.1 | 5.6 | 6.5 | 8.2 | 8.8 | 7.1 | 48 |
| Calm | 2.9 | 3.2 | 3.2 | 3.1 | 2.9 | 3.5 | 4.5 | 4.2 | 3.4 | 2.5 | 2.6 | 2.8 | 3.2 | 48 |
| Direction (Mean Speed, knots) | | | | | | | | | | | | | | |
| North | 8.1 | 7.9 | 9.0 | 8.7 | 8.8 | 7.4 | 6.7 | 6.6 | 7.2 | 7.7 | 8.6 | 8.0 | 8.0 | 48 |
| North Northeast | 8.7 | 8.5 | 9.2 | 9.5 | 8.8 | 7.7 | 7.4 | 7.3 | 8.0 | 8.7 | 9.4 | 8.1 | 8.6 | 48 |
| Northeast | 10.1 | 11.0 | 12.2 | 11.7 | 10.2 | 8.8 | 8.4 | 7.8 | 8.1 | 9.7 | 10.2 | 9.8 | 10.0 | 48 |
| East Northeast | 12.2 | 13.7 | 14.3 | 14.6 | 13.1 | 11.6 | 11.0 | 10.9 | 12.4 | 12.0 | 14.0 | 13.6 | 13.0 | 48 |
| East | 11.6 | 11.2 | 12.5 | 12.5 | 11.3 | 10.3 | 9.4 | 9.4 | 10.6 | 11.0 | 11.8 | 11.2 | 11.1 | 48 |
| East Southeast | 10.7 | 9.5 | 9.3 | 9.5 | 9.5 | 8.9 | 8.1 | 8.4 | 9.1 | 9.2 | 10.1 | 10.7 | 9.3 | 48 |
| Southeast | 9.4 | 8.6 | 8.6 | 8.5 | 8.2 | 8.2 | 7.3 | 7.6 | 8.5 | 8.8 | 9.2 | 9.6 | 8.5 | 48 |
| South Southeast | 8.3 | 8.2 | 8.2 | 8.7 | 8.5 | 8.3 | 7.9 | 8.1 | 8.7 | 8.9 | 8.7 | 8.3 | 8.4 | 48 |
| South | 8.1 | 8.5 | 8.0 | 9.1 | 8.8 | 8.4 | 8.3 | 8.2 | 9.1 | 9.2 | 8.6 | 8.7 | 8.6 | 48 |
| South Southwest | 10.0 | 10.2 | 9.9 | 10.8 | 11.0 | 9.7 | 9.6 | 9.2 | 10.1 | 10.9 | 10.3 | 10.1 | 10.1 | 48 |
| Southwest | 10.5 | 10.7 | 10.8 | 11.4 | 11.1 | 10.5 | 9.5 | 9.3 | 10.5 | 10.8 | 10.6 | 10.3 | 10.4 | 48 |
| West Southwest | 10.1 | 10.1 | 9.9 | 11.1 | 11.1 | 10.1 | 9.1 | 8.8 | 9.7 | 10.3 | 10.1 | 10.0 | 10.0 | 48 |
| West | 10.2 | 9.7 | 9.8 | 10.9 | 10.3 | 9.3 | 8.8 | 8.5 | 9.4 | 10.0 | 10.2 | 10.1 | 9.7 | 48 |
| West Northwest | 11.2 | 10.8 | 11.6 | 11.7 | 11.4 | 10.1 | 9.4 | 9.0 | 10.1 | 11.2 | 12.0 | 11.2 | 10.8 | 48 |
| Northwest | 11.6 | 11.0 | 11.1 | 11.9 | 11.1 | 10.0 | 8.8 | 8.7 | 9.3 | 10.7 | 11.4 | 10.8 | 10.7 | 48 |
| North Northwest | 10.7 | 10.1 | 10.6 | 11.2 | 10.5 | 8.9 | 7.8 | 8.2 | 8.8 | 10.3 | 11.2 | 10.1 | 10.0 | 48 |
| VISIBILITY | | | | | | | | | | | | | | |
| Mean Number of Days with Fog | 10 | 9 | 10 | 9 | 10 | 12 | 11 | 14 | 13 | 12 | 10 | 12 | 132 | 48 |
| Percent Obs with Visibility <= 1/2 mile | 1.93 | 1.76 | 3.28 | 2.63 | 3.58 | 4.04 | 2.81 | 3.29 | 3.38 | 3.15 | 2.79 | 2.33 | 2.92 | 48 |

## METEOROLOGICAL TABLE FOR COASTAL AREA

### LAKE ONTARIO

**Boundaries: From 43.0°N to 44.2°N From 76.0°W to 79.9°W**

| Weather Elements | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind > 33 Knots (1) | 1.8 | 0.6 | 0.4 | 1.0 | 0.2 | 0.1 | 0.1 | 0.2 | 0.4 | 2.0 | 3.5 | 6.2 | 1.2 |
| Wave Height > 9 ft (1) | 1.8 | 0.6 | 0.5 | 0.5 | 0.2 | 0.1 | 0.0 | 0.1 | 0.3 | 1.4 | 2.4 | 2.7 | 0.7 |
| Visibility < 2 nmi (1) | 19.1 | 11.5 | 9.5 | 5.5 | 11.3 | 13.0 | 6.9 | 5.6 | 5.5 | 4.0 | 4.9 | 7.8 | 7.6 |
| Precipitation (1) | 16.0 | 9.4 | 12.4 | 13.1 | 8.8 | 6.8 | 5.2 | 5.9 | 9.3 | 11.0 | 16.8 | 22.0 | 10.2 |
| Temperature > 69 F (1) | 0.0 | 0.0 | 0.0 | 0.1 | 1.5 | 8.7 | 41.7 | 47.1 | 12.9 | 0.6 | 0.0 | 0.0 | 12.7 |
| Mean Temperature (F) | 25.2 | 27.9 | 35.3 | 41.3 | 49.8 | 60.1 | 69.3 | 69.7 | 62.7 | 52.1 | 42.2 | 32.9 | 54.0 |
| Temperature < 33 F (1) | 67.5 | 63.7 | 26.8 | 6.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.1 | 0.5 | 11.2 | 44.3 | 5.9 |
| Mean RH (%) | 86 | 83 | 83 | 80 | 83 | 85 | 81 | 80 | 80 | 79 | 80 | 85 | 82 |
| Overcast or Obscured (1) | 44.8 | 38.8 | 38.9 | 31.8 | 29.7 | 24.1 | 16.8 | 19.7 | 25.0 | 27.9 | 44.9 | 50.3 | 28.7 |
| Mean Cloud Cover (8ths) | 5.7 | 4.7 | 5.1 | 4.7 | 4.8 | 4.4 | 4.0 | 4.1 | 4.5 | 4.9 | 6.0 | 6.3 | 4.8 |
| Mean SLP (mbs) | 1017 | 1020 | 1017 | 1015 | 1015 | 1014 | 1014 | 1016 | 1017 | 1017 | 1016 | 1018 | 1016 |
| Ext. Max. SLP (mbs) | 1046 | 1037 | 1039 | 1043 | 1034 | 1032 | 1035 | 1037 | 1038 | 1039 | 1043 | 1042 | 1046 |
| Ext. Min. SLP (mbs) | 989 | 988 | 990 | 978 | 977 | 986 | 995 | 992 | 989 | 984 | 983 | 988 | 977 |
| Prevailing Wind Direction | W | SW | NW | W | W | SW | SW | SW | SW | W | W | W | W |
| Thunder and Lightning (1) | 0.0 | 0.0 | 0.5 | 0.8 | 1.0 | 1.8 | 2.0 | 2.0 | 1.4 | 0.8 | 0.2 | 0.3 | 1.2 |

(1) Percentage Frequency

These data are based upon observations made by ships in passage.
Such ships tend to avoid bad weather when possible, thus biasing the data toward good weather samples.

**METEOROLOGICAL TABLE FOR COASTAL AREA**

**LAKE ERIE**

**Boundaries: From 41.3°N to 43.0°N From 79.0°W to 83.5°W**

| Weather Elements | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind > 33 Knots (1) | 5.1 | 1.6 | 1.3 | 1.5 | 0.6 | 0.4 | 0.2 | 0.3 | 1.0 | 3.6 | 5.9 | 8.2 | 2.0 |
| Wave Height > 9 ft (1) | 1.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.1 | 0.2 | 0.4 | 1.6 | 2.1 | 2.6 | 0.7 |
| Visibility < 2 nmi (1) | 10.4 | 8.0 | 11.0 | 7.6 | 7.3 | 7.6 | 5.9 | 7.2 | 3.4 | 2.9 | 3.7 | 6.8 | 5.9 |
| Precipitation (1) | 35.4 | 34.5 | 20.7 | 12.1 | 8.7 | 6.1 | 5.4 | 5.9 | 7.7 | 10.1 | 15.5 | 21.9 | 9.9 |
| Temperature > 69 F (1) | 0.0 | 0.1 | 0.1 | 0.3 | 3.7 | 23.0 | 62.9 | 64.3 | 24.4 | 0.9 | 0.0 | 0.0 | 22.3 |
| Mean Temperature (F) | 23.5 | 28.2 | 36.7 | 43.5 | 54.2 | 65.4 | 72.1 | 72.1 | 65.3 | 54.3 | 43.5 | 34.3 | 57.8 |
| Temperature < 33 F (1) | 78.8 | 61.2 | 26.8 | 4.8 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 8.6 | 37.2 | 4.6 |
| Mean RH (%) | 81 | 82 | 80 | 81 | 81 | 82 | 80 | 79 | 78 | 77 | 78 | 82 | 80 |
| Overcast or Obscured (1) | 52.6 | 44.6 | 44.2 | 32.5 | 26.4 | 21.0 | 18.2 | 22.0 | 24.0 | 29.3 | 46.6 | 55.0 | 28.8 |
| Mean Cloud Cover (8ths) | 6.2 | 5.6 | 5.5 | 4.9 | 4.6 | 4.2 | 4.1 | 4.3 | 4.5 | 5.0 | 6.1 | 6.5 | 4.8 |
| Mean SLP (mbs) | 1017 | 1019 | 1017 | 1015 | 1015 | 1015 | 1015 | 1016 | 1018 | 1016 | 1017 | 1018 | 1016 |
| Ext. Max. SLP (mbs) | 1042 | 1046 | 1038 | 1049 | 1052 | 1040 | 1042 | 1046 | 1054 | 1049 | 1053 | 1046 | 1054 |
| Ext. Min. SLP (mbs) | 985 | 985 | 984 | 969 | 979 | 980 | 984 | 983 | 981 | 979 | 969 | 968 | 968 |
| Prevailing Wind Direction | SW | SW | SW | SW | SW | SW | SW | SW | SW | SW | SW | SW | SW |
| Thunder and Lightning (1) | 0.6 | 0.6 | 0.6 | 1.0 | 1.5 | 3.0 | 3.3 | 3.0 | 2.2 | 1.0 | 0.5 | 0.3 | 1.9 |

(1) Percentage Frequency

These data are based upon observations made by ships in passage.
Such ships tend to avoid bad weather when possible, thus biasing the data toward good weather samples.

**METEOROLOGICAL TABLE FOR COASTAL AREA**

**LAKE HURON**

**Boundaries: From 43.0°N to 46.5°N From 80.0°W to 85.0°W**

| Weather Elements | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind > 33 Knots (1) | 3.4 | 0.3 | 1.4 | 1.6 | 0.5 | 0.2 | 0.2 | 0.4 | 1.2 | 2.8 | 5.0 | 5.6 | 1.6 |
| Wave Height > 9 ft (1) | 2.2 | 1.0 | 1.0 | 0.5 | 0.3 | 0.1 | 0.2 | 0.2 | 0.7 | 1.5 | 2.4 | 2.5 | 0.8 |
| Visibility < 2 nmi (1) | 10.0 | 7.7 | 9.7 | 7.9 | 10.8 | 10.4 | 6.5 | 5.3 | 3.9 | 3.3 | 4.5 | 7.5 | 6.8 |
| Precipitation (1) | 35.2 | 31.4 | 16.4 | 11.5 | 7.8 | 6.0 | 4.8 | 6.5 | 8.6 | 10.7 | 17.4 | 23.8 | 10.2 |
| Temperature > 69 F (1) | 0.0 | 0.1 | 0.1 | 0.2 | 1.3 | 6.7 | 21.7 | 25.6 | 6.7 | 0.4 | 0.0 | 0.0 | 7.8 |
| Mean Temperature (F) | 22.2 | 21.6 | 31.4 | 39.6 | 47.3 | 57.1 | 65.7 | 66.8 | 59.9 | 49.6 | 39.2 | 30.5 | 52.1 |
| Temperature < 33 F (1) | 81.6 | 80.9 | 49.3 | 11.7 | 0.7 | 0.1 | 0.0 | 0.0 | 0.0 | 0.9 | 20.6 | 54.8 | 8.5 |
| Mean RH (%) | 81 | 82 | 78 | 81 | 82 | 85 | 84 | 83 | 79 | 80 | 82 | 85 | 82 |
| Overcast or Obscured (1) | 56.3 | 44.9 | 35.7 | 32.5 | 27.2 | 22.4 | 18.8 | 21.9 | 26.1 | 32.2 | 48.4 | 53.6 | 29.9 |
| Mean Cloud Cover (8ths) | 6.4 | 5.6 | 4.9 | 4.8 | 4.5 | 4.3 | 4.1 | 4.3 | 4.7 | 5.2 | 6.2 | 6.5 | 4.9 |
| Mean SLP (mbs) | 1016 | 1020 | 1016 | 1015 | 1015 | 1015 | 1014 | 1016 | 1017 | 1015 | 1015 | 1017 | 1015 |
| Ext. Max. SLP (mbs) | 1045 | 1049 | 1046 | 1047 | 1058 | 1051 | 1048 | 1046 | 1051 | 1060 | 1057 | 1055 | 1060 |
| Ext. Min. SLP (mbs) | 981 | 985 | 979 | 975 | 973 | 973 | 981 | 986 | 978 | 971 | 964 | 965 | 964 |
| Prevailing Wind Direction | W | NW | NW | NW | NW | S | S | SW | S | S | W | W | S |
| Thunder and Lightning (1) | 0.5 | 0.4 | 0.5 | 0.7 | 1.1 | 1.8 | 2.2 | 2.3 | 1.7 | 0.7 | 0.3 | 0.3 | 1.3 |

(1) Percentage Frequency

These data are based upon observations made by ships in passage.
Such ships tend to avoid bad weather when possible, thus biasing the data toward good weather samples.

**METEOROLOGICAL TABLE FOR COASTAL AREA**

**LAKE MICHIGAN**

**Boundaries: From 41.5°N to 46.0°N From 85.0°W to 88.0°W**

| Weather Elements | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind > 33 Knots (1) | 5.6 | 4.5 | 2.6 | 1.7 | 0.8 | 0.3 | 0.3 | 0.5 | 1.6 | 3.8 | 5.1 | 5.5 | 2.2 |
| Wave Height > 9 ft (1) | 2.8 | 2.1 | 1.0 | 0.9 | 0.6 | 0.2 | 0.2 | 0.4 | 1.2 | 2.5 | 3.0 | 3.1 | 1.4 |
| Visibility < 2 nmi (1) | 11.4 | 7.0 | 8.2 | 7.4 | 11.0 | 11.4 | 5.7 | 4.2 | 2.8 | 2.0 | 2.9 | 6.4 | 6.1 |
| Precipitation (1) | 16.2 | 9.0 | 7.8 | 8.7 | 5.2 | 4.1 | 3.7 | 5.0 | 6.1 | 7.8 | 12.4 | 15.7 | 7.5 |
| Temperature > 69 F (1) | 0.0 | 0.3 | 0.2 | 0.0 | 0.4 | 4.2 | 21.5 | 30.3 | 8.0 | 0.3 | 0.0 | 0.0 | 7.1 |
| Mean Temperature (F) | 22.9 | 25.2 | 33.6 | 40.0 | 46.6 | 55.8 | 65.5 | 67.4 | 60.9 | 50.0 | 39.2 | 29.9 | 50.2 |
| Temperature < 33 F (1) | 78.7 | 74.3 | 38.8 | 8.5 | 1.0 | 0.2 | 0.1 | 0.1 | 0.0 | 1.0 | 20.2 | 55.5 | 11.3 |
| Mean RH (%) | 52 | 79 | 80 | 80 | 77 | 81 | 86 | 83 | 82 | 70 | 65 | 84 | 80 |
| Overcast or Obscured (1) | 48.4 | 41.0 | 34.5 | 34.2 | 26.1 | 23.3 | 19.3 | 22.6 | 24.4 | 29.8 | 44.0 | 48.9 | 30.0 |
| Mean Cloud Cover (8ths) | 6.0 | 5.6 | 5.0 | 4.9 | 4.4 | 4.3 | 4.1 | 4.3 | 4.5 | 4.9 | 5.9 | 6.1 | 4.8 |
| Mean SLP (mbs) | 1018 | 1018 | 1017 | 1014 | 1016 | 1015 | 1015 | 1017 | 1017 | 1015 | 1016 | 1018 | 1016 |
| Ext. Max. SLP (mbs) | 1041 | 1040 | 1050 | 1056 | 1053 | 1047 | 1046 | 1046 | 1050 | 1053 | 1059 | 1058 | 1059 |
| Ext. Min. SLP (mbs) | 980 | 983 | 979 | 975 | 975 | 973 | 983 | 986 | 980 | 976 | 962 | 970 | 962 |
| Prevailing Wind Direction | W | NW | N | N | S | S | S | S | S | S | NW | NW | S |
| Thunder and Lightning (1) | 0.1 | 0.1 | 0.4 | 1.1 | 1.2 | 2.0 | 2.5 | 2.6 | 1.8 | 0.8 | 0.3 | 0.2 | 1.4 |

(1) Percentage Frequency

These data are based upon observations made by ships in passage.
Such ships tend to avoid bad weather when possible, thus biasing the data toward good weather samples.

**METEOROLOGICAL TABLE FOR COASTAL AREA**

**LAKE SUPERIOR**

**Boundaries: From 46.5°N to 49.0°N From 84.0°W to 92.0°W**

| Weather Elements | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind > 33 Knots (1) | 5.2 | 0.7 | 1.6 | 2.0 | 1.0 | 0.4 | 0.2 | 0.4 | 1.7 | 3.7 | 5.0 | 5.5 | 2.0 |
| Wave Height > 9 ft (1) | 6.7 | 2.7 | 2.9 | 1.7 | 0.9 | 0.3 | 0.2 | 0.3 | 1.7 | 3.0 | 4.5 | 4.9 | 1.9 |
| Visibility < 2 nmi (1) | 13.0 | 4.5 | 6.5 | 5.9 | 9.1 | 14.9 | 16.6 | 8.7 | 4.0 | 3.0 | 4.3 | 11.4 | 8.8 |
| Precipitation (1) | 38.5 | 29.1 | 16.9 | 9.7 | 8.0 | 5.4 | 4.1 | 5.5 | 8.2 | 11.7 | 21.0 | 34.6 | 11.3 |
| Temperature > 69 F (1) | 0.0 | 0.1 | 0.0 | 0.0 | 0.3 | 1.2 | 4.2 | 5.8 | 1.5 | 0.1 | 0.0 | 0.0 | 1.6 |
| Mean Temperature (F) | 15.0 | 14.0 | 27.3 | 37.3 | 43.2 | 48.6 | 55.5 | 60.1 | 55.0 | 45.2 | 34.5 | 24.8 | 45.3 |
| Temperature < 33 F (1) | 93.6 | 90.3 | 65.4 | 18.2 | 2.4 | 0.2 | 0.1 | 0.0 | 0.1 | 3.6 | 39.0 | 73.2 | 14.6 |
| Mean RH (%) | 75 | 77 | 83 | 82 | 81 | 85 | 88 | 88 | 85 | 81 | 82 | 88 | 84 |
| Overcast or Obscured (1) | 55.8 | 39.3 | 36.0 | 28.5 | 26.1 | 25.5 | 22.7 | 22.1 | 26.3 | 34.0 | 49.0 | 57.1 | 31.4 |
| Mean Cloud Cover (8ths) | 6.5 | 5.2 | 5.0 | 4.5 | 4.4 | 4.5 | 4.4 | 4.2 | 4.7 | 5.3 | 6.2 | 6.7 | 4.9 |
| Mean SLP (mbs) | 1016 | 1018 | 1019 | 1015 | 1015 | 1014 | 1014 | 1015 | 1016 | 1013 | 1015 | 1017 | 1015 |
| Ext. Max. SLP (mbs) | 1042 | 1040 | 1044 | 1057 | 1058 | 1054 | 1048 | 1049 | 1056 | 1056 | 1056 | 1060 | 1060 |
| Ext. Min. SLP (mbs) | 990 | 987 | 980 | 968 | 971 | 976 | 981 | 982 | 975 | 966 | 961 | 976 | 961 |
| Prevailing Wind Direction | W | W | W | NE | NE | W | SW | SW | SW | NW | NW | NW | NW |
| Thunder and Lightning (1) | 0.3 | 0.1 | 0.6 | 0.7 | 0.9 | 1.6 | 2.0 | 2.2 | 1.8 | 0.6 | 0.3 | 0.4 | 1.2 |

(1) Percentage Frequency

These data are based upon observations made by ships in passage.
Such ships tend to avoid bad weather when possible, thus biasing the data toward good weather samples.

# ATLANTIC OCEAN DISTANCES
(Nautical Miles)

| | Montreal | Cabot Strait | Gut of Canso | Portland | Boston | Nantucket Shoals | NY NY | Philadelphia | Baltimore | Chesapeake Bay | Norfolk | Diamond Shoals | Wilmington | Charleston | Savannah | Jacksonville | Key West | Straits of FL | Tampa | Pensacola | Mobile | New Orleans | Port Arthur | Galveston | Corpus Christi | San Juan | Yukatan | Pan Can Atlantic | Pan Can Pacific |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 29 Panama Canal (Pac. Ent.) 08° 53.0N, 79° 31.0'W | 3249 | 2566 | 2465 | 2235 | 2195 | 2032 | 2018 | 2001 | 1950 | 1800 | 1827 | 1683 | 1655 | 1609 | 1610 | 1559 | 1106 | 1047 | 1259 | 1388 | 1417 | 1442 | 1533 | 1539 | 1595 | 1036 | 855 | 46 | |
| 28 Panama Canal (Atl. Ent.) 09°23.5'N, 79°55.3'W | 3203 | 2522 | 2419 | 2189 | 2149 | 1986 | 1972 | 1955 | 1904 | 1754 | 1781 | 1637 | 1609 | 1563 | 1564 | 1513 | 1060 | 1001 | 1213 | 1342 | 1371 | 1396 | 1487 | 1493 | 1549 | 990 | 809 | | |
| 27 Yucatan Channel 21°50.0N, 85°03.0'W | 2730 | 2049 | 1937 | 1629 | 1589 | 1426 | 1346 | 1323 | 1268 | 1118 | 1145 | 1001 | 904 | 809 | 780 | 699 | 251 | 192 | 404 | 533 | 562 | 587 | 691 | 696 | 769 | 1111 | | | |
| 26 San Juan PR 18°27.6N, 66°06.7'W | 2445 | 1764 | 1669 | 1531 | 1486 | 1334 | 1399 | 1395 | 1375 | 1225 | 1252 | 1114 | 1153 | 1138 | 1156 | 1121 | 966 | 1017 | 1249 | 1448 | 1448 | 1557 | 1717 | 1719 | 1824 | | | | |
| 25 Corpus Christi TX 27°48.8N, 97°24.0'W | 3347 | 2666 | 2558 | 2255 | 2215 | 2052 | 1977 | 1954 | 1899 | 1749 | 1776 | 1632 | 1535 | 1440 | 1411 | 1330 | 860 | 807 | 810 | 618 | 605 | 555 | 249 | 207 | | | | | |
| 24 Galveston TX 29°19.0'N, 94°47.0'W | 3242 | 2561 | 2453 | 2150 | 2110 | 1947 | 1872 | 1849 | 1794 | 1644 | 1671 | 1527 | 1430 | 1335 | 1306 | 1225 | 775 | 702 | 703 | 509 | 496 | 446 | 89 | | | | | | |
| 23 Port Arthur TX 29°49.5N, 93°57.6'W | 3240 | 2559 | 2451 | 2148 | 2108 | 1945 | 1870 | 1847 | 1792 | 1642 | 1669 | 1525 | 1428 | 1333 | 1304 | 1223 | 773 | 700 | 697 | 504 | 491 | 441 | | | | | | | |
| 22 New Orleans (via SW Pass) 29°57.0'N, 90°03.7'W | 3080 | 2399 | 2291 | 1966 | 1948 | 1785 | 1710 | 1687 | 1632 | 1482 | 1509 | 1635 | 1268 | 1173 | 1144 | 1063 | 613 | 540 | 502 | 288 | 269 | | | | | | | | |
| 21 Mobile AL 30°42.5'N, 88°02.5'W | 3011 | 2330 | 2222 | 1919 | 1879 | 1716 | 1641 | 1618 | 1563 | 1413 | 1440 | 1296 | 1199 | 1104 | 1075 | 994 | 544 | 471 | 389 | 89 | | | | | | | | | |
| 20 Pensacola FL 30°24.0'N, 87°13.0'W | 2977 | 2296 | 2188 | 1685 | 1845 | 1682 | 1607 | 1584 | 1529 | 1379 | 1406 | 1262 | 1165 | 1070 | 1041 | 960 | 510 | 437 | 347 | | | | | | | | | | |
| 19 Tampa FL 27°56.5'N, 82°26.7'W | 2772 | 2091 | 1983 | 1680 | 1640 | 1477 | 1402 | 1379 | 1324 | 1174 | 1201 | 1057 | 960 | 865 | 836 | 755 | 305 | 232 | | | | | | | | | | | |
| 18 Straits of Florida 24°25.0'N, 83°00.0'W | 2540 | 1859 | 1751 | 1448 | 1408 | 1245 | 1170 | 1147 | 1092 | 942 | 969 | 825 | 728 | 633 | 604 | 523 | 73 | | | | | | | | | | | | |
| 17 Key West FL 24°33.7'N, 81°48.5'W | 2479 | 1796 | 1690 | 1387 | 1347 | 1184 | 1109 | 1086 | 1031 | 881 | 906 | 764 | 667 | 572 | 543 | 462 | | | | | | | | | | | | | |
| 16 Jacksonville FL 32°05.0N, 81°05.7'W | 2172 | 1491 | 1379 | 1071 | 1031 | 868 | 788 | 765 | 710 | 560 | 587 | 443 | 315 | 197 | 145 | | | | | | | | | | | | | | |
| 15 Savannah GA 32°05.0'N, 81°05.7'W | 2088 | 1407 | 1295 | 967 | 947 | 784 | 704 | 681 | 626 | 476 | 503 | 359 | 227 | 102 | | | | | | | | | | | | | | | |
| 14 Charleston SC 32°47.2'N, 79°55.2'W | 2014 | 1333 | 1221 | 913 | 873 | 710 | 630 | 607 | 552 | 402 | 429 | 285 | 151 | | | | | | | | | | | | | | | | |
| 13 Wilmington NC 34°14.0'N, 77°57.0'W | 1948 | 1267 | 1155 | 847 | 807 | 644 | 564 | 541 | 486 | 336 | 363 | 219 | | | | | | | | | | | | | | | | | |
| 12 Diamond Shoals 35°08.0'N, 75°15.0'W | 1729 | 1048 | 936 | 626 | 588 | 425 | 345 | 322 | 267 | 117 | 144 | | | | | | | | | | | | | | | | | | |
| 11 Norfolk VA 36°50.9'N, 76°17.9'W | 1716 | 1035 | 923 | 611 | 571 | 406 | 294 | 269 | 173 | 27 | | | | | | | | | | | | | | | | | | | |
| 10 Chesapeake Bay Ent. 36°56.3'N, 75°58.6W | 1689 | 1006 | 896 | 584 | 544 | 381 | 267 | 242 | 150 | | | | | | | | | | | | | | | | | | | | |
| 09 Baltimore MD 39°16.0N, 76°34.5'W | 1838 | 1157 | 1046 | 734 | 694 | 531 | 417 | 392 | | | | | | | | | | | | | | | | | | | | | |
| 08 Philadelphia PA 39°56.8'N, 75°08.3'W | 1682 | 1001 | 890 | 575 | 535 | 372 | 240 | | | | | | | | | | | | | | | | | | | | | | |
| 07 New York NY 40°42.0W, 74°01.0'W | 1534 | 1534 | 742 | 426 | 366 | 223 | | | | | | | | | | | | | | | | | | | | | | | |
| 06 Nantucket Shoals 40°30.0'N, 69°25.0'W | 1311 | 630 | 519 | 203 | 163 | | | | | | | | | | | | | | | | | | | | | | | | |
| 05 Boston MA 42°22.0'N, 71°03.0'W | 1318 | 637 | 526 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 04 Portland, ME 43°39.4'N, 70°14.7'W | 1276 | 595 | 484 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03 Gut of Canso (Lock) 45°39.0'N, 61°25.0'W | 717 | 120 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 02 Cabot Strait 47°07.0N, 60°17.0'W | 681 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 01 Montreal * (St. Lambert Lock) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**All distances are by outside routes which can be used by the deepest-draft vessel that the above ports can accomodate Lighter-draft vessels can save considerable mileage by transiting Canso Lock (Canada), the Cape Cod Canal (Massachusetts), and the Chesapeake & Delaware Canal**

* Quebec, Canada - SUBTRACT 139 miles

# DISTANCES BETWEEN POINTS ON GREAT LAKES

(Statute Miles)

| | | 36 Montreal | 35 Ogdensburg | 34 Kingston | 33 Toronto | 32 Oswego | 31 Rochester | 30 Port Colborne | 29 Buffalo | 28 Erie | 27 Conneaut | 26 Ashtabula | 25 Fairport | 24 Cleveland | 23 Lorain | 22 Toledo | 21 Detroit | 20 Port Huron | 19 Midland | 18 Collingwood | 17 Goderich | 16 Bay City | 15 Alpena | 14 Ludington | 13 Muskegon | 12 Gary | 11 Chicago | 10 Milwaukee | 9 Green Bay | 8 Escanaba | 7 Sault Ste. Marie | 6 Marquette | 5 Houghton | 4 Ashland | 3 Duluth | 2 Two Harbors |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Thunder Bay (Port Arthur), Canada | 1217 | 1098 | 1034 | 903 | 1018 | 985 | 848 | 864 | 795 | 768 | 754 | 729 | 711 | 694 | 658 | 604 | 542 | 538 | 531 | 506 | 505 | 410 | 536 | 587 | 699 | 686 | 621 | 560 | 492 | 273 | 171 | 118 | 164 | 195 | 172 |
| 2 | Two Harbors, Minn. | 1315 | 1194 | 1132 | 1001 | 1114 | 1083 | 946 | 963 | 893 | 866 | 852 | 826 | 809 | 792 | 756 | 702 | 640 | 638 | 630 | 604 | 603 | 508 | 634 | 685 | 797 | 785 | 720 | 659 | 590 | 371 | 239 | 157 | 71 | 26 | |
| 3 | Duluth, Minn. | 1339 | 1218 | 1156 | 1025 | 1138 | 1087 | 970 | 988 | 917 | 890 | 876 | 851 | 833 | 816 | 781 | 726 | 664 | 661 | 653 | 628 | 627 | 532 | 657 | 709 | 820 | 808 | 743 | 682 | 614 | 394 | 261 | 179 | 98 | | |
| 4 | Ashland, Wis. | 1293 | 1172 | 1110 | 979 | 1092 | 1041 | 924 | 941 | 871 | 844 | 830 | 806 | 788 | 771 | 734 | 680 | 618 | 616 | 608 | 583 | 581 | 486 | 612 | 663 | 775 | 763 | 696 | 637 | 588 | 349 | 213 | 131 | | | |
| 5 | Houghton, Mich. | 1185 | 1044 | 982 | 851 | 964 | 913 | 796 | 813 | 743 | 716 | 702 | 678 | 659 | 643 | 606 | 552 | 490 | 488 | 480 | 455 | 453 | 358 | 484 | 535 | 647 | 635 | 570 | 509 | 440 | 221 | 84 | | | | |
| 6 | Marquette, Mich. | 1104 | 983 | 921 | 790 | 903 | 852 | 735 | 751 | 682 | 655 | 641 | 616 | 598 | 581 | 545 | 491 | 429 | 426 | 418 | 393 | 391 | 297 | 422 | 474 | 585 | 573 | 508 | 447 | 378 | 159 | | | | | |
| 7 | Sault Ste. Marie, Mich. (a) | 944 | 823 | 761 | 630 | 743 | 692 | 575 | 592 | 522 | 495 | 481 | 457 | 438 | 422 | 385 | 331 | 269 | 267 | 259 | 234 | 232 | 137 | 263 | 314 | 426 | 414 | 349 | 266 | 219 | | | | | | |
| 8 | Escanaba, Mich. | 1051 | 930 | 868 | 737 | 850 | 799 | 682 | 699 | 629 | 602 | 588 | 564 | 545 | 528 | 492 | 438 | 376 | 364 | 376 | 340 | 339 | 244 | 130 | 181 | 266 | 274 | 201 | 101 | | | | | | | |
| 9 | Green Bay, Wis. | 1120 | 999 | 937 | 806 | 919 | 868 | 751 | 767 | 698 | 671 | 657 | 632 | 614 | 597 | 561 | 507 | 445 | 452 | 444 | 409 | 407 | 313 | 123 | 171 | 272 | 255 | 180 | | | | | | | | |
| 10 | Milwaukee, Wis. | 1181 | 1060 | 996 | 867 | 980 | 929 | 812 | 828 | 759 | 732 | 718 | 693 | 675 | 658 | 622 | 568 | 508 | 513 | 505 | 470 | 468 | 374 | 97 | 80 | 103 | 85 | | | | | | | | | |
| 11 | Chicago, Ill. | 1248 | 1125 | 1063 | 932 | 1045 | 994 | 877 | 893 | 824 | 797 | 783 | 758 | 740 | 723 | 688 | 633 | 571 | 578 | 570 | 535 | 534 | 439 | 156 | 114 | 25 | | | | | | | | | | |
| 12 | Gary, Ind. | 1268 | 1137 | 1075 | 944 | 1057 | 1006 | 889 | 905 | 836 | 809 | 795 | 770 | 752 | 735 | 699 | 645 | 583 | 590 | 582 | 547 | 546 | 451 | 187 | 121 | | | | | | | | | | | |
| 13 | Muskegon, Mich. | 1146 | 1025 | 963 | 832 | 945 | 894 | 777 | 794 | 724 | 697 | 683 | 659 | 640 | 623 | 587 | 533 | 471 | 479 | 471 | 435 | 434 | 339 | 56 | | | | | | | | | | | | |
| 14 | Ludington, Mich. | 1095 | 974 | 912 | 781 | 894 | 843 | 726 | 742 | 673 | 646 | 632 | 607 | 589 | 572 | 536 | 482 | 420 | 427 | 419 | 384 | 383 | 288 | | | | | | | | | | | | | |
| 15 | Alpena, Mich. | 832 | 711 | 649 | 518 | 631 | 580 | 463 | 479 | 410 | 383 | 369 | 344 | 326 | 309 | 273 | 219 | 157 | 193 | 185 | 124 | 116 | | | | | | | | | | | | | | |
| 16 | Bay City, Mich. | 837 | 716 | 654 | 523 | 636 | 585 | 468 | 484 | 415 | 388 | 374 | 349 | 331 | 314 | 278 | 224 | 162 | 265 | 257 | 137 | | | | | | | | | | | | | | | |
| 17 | Goderich, Canada | 740 | 619 | 557 | 426 | 536 | 488 | 371 | 387 | 318 | 291 | 277 | 252 | 234 | 217 | 181 | 127 | 65 | 211 | 207 | | | | | | | | | | | | | | | | |
| 18 | Collingwood, Canada | 933 | 812 | 750 | 619 | 732 | 681 | 564 | 580 | 511 | 484 | 470 | 446 | 427 | 410 | 374 | 320 | 258 | 55 | | | | | | | | | | | | | | | | | |
| 19 | Midland, Canada | 941 | 820 | 758 | 627 | 740 | 689 | 572 | 588 | 519 | 492 | 478 | 453 | 435 | 418 | 382 | 328 | 266 | | | | | | | | | | | | | | | | | | |
| 20 | Port Huron, Mich. (b) | 675 | 554 | 492 | 361 | 474 | 423 | 306 | 322 | 253 | 226 | 213 | 188 | 170 | 152 | 116 | 62 | | | | | | | | | | | | | | | | | | | |
| 21 | Detroit, Mich. (Woodward Ave.) | 613 | 492 | 430 | 299 | 412 | 361 | 244 | 261 | 191 | 164 | 150 | 126 | 108 | 91 | 54 | | | | | | | | | | | | | | | | | | | | |
| 22 | Toledo, Ohio (river mouth) | 606 | 485 | 423 | 292 | 405 | 354 | 237 | 254 | 185 | 157 | 144 | 119 | 98 | 72 | | | | | | | | | | | | | | | | | | | | | |
| 23 | Lorain, Ohio | 549 | 428 | 366 | 235 | 348 | 297 | 180 | 197 | 124 | 95 | 80 | 53 | 26 | | | | | | | | | | | | | | | | | | | | | | |
| 24 | Cleveland, Ohio (main entrance) | 529 | 408 | 348 | 215 | 328 | 277 | 160 | 178 | 102 | 73 | 59 | 33 | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | Fairport, Ohio | 499 | 378 | 316 | 186 | 298 | 247 | 130 | 148 | 73 | 44 | 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | Ashtabula, Ohio | 473 | 352 | 290 | 159 | 272 | 221 | 104 | 119 | 45 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | Conneaut, Ohio | 461 | 340 | 278 | 147 | 260 | 209 | 92 | 107 | 33 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Erie, Pa. | 434 | 313 | 251 | 120 | 233 | 182 | 85 | 78 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | Buffalo, N.Y. (north entrance) | 391 | 270 | 208 | 77 | 190 | 139 | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | Port Colborne, Canada | 369 | 248 | 186 | 55 | 168 | 117 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | Rochester, N.Y. | 271 | 149 | 89 | 95 | 58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | Oswego, N.Y. | 232 | 108 | 55 | 145 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | Toronto, Canada | 342 | 223 | 161 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | Kingston, Canada | 185 | 63 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | Ogdensburg, N.Y. | 123 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | Montreal, Canada (c) | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(a) From abreast east end of U.S. center pier

(b) From foot of Grand River Ave.

(c) St. Lambert Lock

## EXPLANATION

Distances in the Great Lakes are expressed to the nearest even statute mile; fractions of ½ mile or more being taken as a full mile and those under the half dropped. The results are, therefore, at times inconsistent by 1 mile in their comparative differences. Thus, measured distances to two given points may differ uniformly by 0.8 mile; if the respective distances to the two points from a certain port measure 116.0 and 115.2, they appear in the table as 116 and 115, a difference of 1 mile; whereas from the next port listed, the distance to the same two points may measure 105.4 and 104.6, and both will appear in the table as 105.

Measurements are by the shortest marked or safe direct courses, starting (unless otherwise noted) from the main entrance between pierheads of breakwaters or piers, or from the principal landings of open roadsteads. Where landings are appreciably remote from protected entrances, the appropriate further distances, if desired, may be ascertained from the harbor descriptions or from charts.

Points in this table are arranged in the order of their location on the several lakes in the following sequence; Lake Ontario, Lake Erie, Lake Huron, Lake Michigan, and Lake Superior.

The distance between any two points appears in the line extending horizontally from the point first in the order in the list and in the column headed by the other point.

# DISTANCES BETWEEN POINTS ON LAKE ONTARIO AND ST. LAWRENCE RIVER

(Statute Miles)

| | | 36 | 35 | 34 | 33 | 32 | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Quebec | Montreal (St. Lambert Lock) | Cote Ste. Catherine Lock | Beauharnois Lock | Coteau Island | Snell Lock | Eisenhower Lock | Iroquois Lock | Ogdensburg | Brockville | Alexandria Bay | Thousand Island Park | Clayton | Gananoque | Kingston | Picton | Deseronto | Belleville | Trenton | Cobourg | Port Hope | Toronto | Hamilton | Port Weller | Lewiston | Niagara-on-the-Lake | Olcott | Rochester | Sodus Bay | Little Sodus Bay | Oswego | Sacketts Harbor | Cape Vincent | Port Colborne |
| 1 | OLD MACKINAC POINT (a) | 1084 | 922 | 914 | 892 | 848 | 841 | 837 | 812 | 799 | 787 | 766 | 760 | 755 | 756 | 739 | 726 | 713 | 687 | 666 | 653 | 648 | 608 | 610 | 580 | 596 | 592 | 606 | 670 | 698 | 712 | 721 | 745 | 740 | 553 |
| 2 | PORT HURON (b) | 837 | 675 | 667 | 645 | 601 | 594 | 590 | 565 | 552 | 540 | 519 | 513 | 508 | 511 | 492 | 479 | 466 | 450 | 441 | 406 | 401 | 361 | 363 | 333 | 351 | 345 | 361 | 423 | 451 | 465 | 474 | 498 | 493 | 306 |
| 3 | PORT COLBORNE | 531 | 369 | 361 | 339 | 295 | 288 | 284 | 259 | 246 | 234 | 213 | 207 | 202 | 205 | 186 | 173 | 160 | 144 | 135 | 100 | 95 | 55 | 57 | 27 | 45 | 39 | 55 | 117 | 145 | 159 | 188 | 192 | 187 | |
| 4 | Cape Vincent, N.Y. | 344 | 183 | 175 | 153 | 109 | 102 | 98 | 73 | 60 | 48 | 27 | 20 | 16 | 19 | 24 | 45 | 51 | 67 | 78 | 101 | 106 | 160 | 166 | 160 | 160 | 154 | 134 | 89 | 69 | 59 | 49 | 26 | | |
| 5 | Sacketts Harbor, N.Y. | 370 | 209 | 201 | 179 | 135 | 128 | 124 | 99 | 86 | 74 | 53 | 46 | 42 | 45 | 36 | 56 | 61 | 78 | 88 | 106 | 112 | 165 | 191 | 165 | 164 | 158 | 138 | 88 | 64 | 52 | 41 | | | |
| 6 | Oswego, N.Y. | 391 | 232 | 224 | 202 | 158 | 151 | 147 | 122 | 108 | 97 | 76 | 69 | 65 | 68 | 55 | 66 | 71 | 88 | 82 | 91 | 96 | 145 | 166 | 141 | 139 | 133 | 113 | 59 | 29 | 15 | | | | |
| 7 | Little Sodus Bay, N.Y. | 401 | 241 | 233 | 211 | 167 | 160 | 156 | 131 | 118 | 106 | 85 | 78 | 74 | 77 | 64 | 73 | 78 | 88 | 79 | 85 | 90 | 136 | 157 | 131 | 130 | 124 | 104 | 48 | 18 | | | | | |
| 8 | Sodus Bay, N.Y. | 411 | 251 | 243 | 221 | 177 | 170 | 166 | 141 | 128 | 116 | 95 | 88 | 84 | 87 | 72 | 80 | 86 | 83 | 74 | 77 | 81 | 124 | 145 | 118 | 118 | 112 | 92 | 35 | | | | | | |
| 9 | Rochester, N.Y. (Charlotte) | 432 | 271 | 263 | 241 | 197 | 190 | 186 | 161 | 149 | 136 | 115 | 108 | 104 | 107 | 90 | 98 | 89 | 73 | 64 | 57 | 60 | 96 | 117 | 89 | 89 | 83 | 63 | | | | | | | |
| 10 | Olcott, N.Y. | 478 | 316 | 308 | 286 | 242 | 235 | 231 | 206 | 193 | 181 | 160 | 153 | 149 | 152 | 134 | 121 | 109 | 92 | 83 | 51 | 47 | 36 | 55 | 28 | 28 | 22 | | | | | | | | |
| 11 | Niagara-on-the Lake, Canada | 500 | 336 | 328 | 306 | 262 | 255 | 251 | 226 | 213 | 201 | 180 | 173 | 169 | 172 | 154 | 141 | 128 | 111 | 102 | 66 | 63 | 30 | 39 | 11 | 6 | | | | | | | | | |
| 12 | Lewiston, N.Y. | 506 | 342 | 334 | 312 | 268 | 261 | 257 | 232 | 219 | 207 | 186 | 179 | 175 | 178 | 160 | 147 | 134 | 117 | 108 | 72 | 69 | 36 | 45 | 17 | | | | | | | | | | |
| 13 | Port Weller, N.Y. | 504 | 342 | 334 | 312 | 268 | 261 | 257 | 232 | 219 | 207 | 186 | 179 | 175 | 178 | 159 | 146 | 133 | 117 | 107 | 72 | 68 | 26 | 30 | | | | | | | | | | | |
| 14 | Hamilton, Canada | 530 | 367 | 359 | 337 | 293 | 286 | 282 | 257 | 244 | 232 | 211 | 205 | 200 | 204 | 185 | 169 | 156 | 140 | 131 | 94 | 88 | *30 | | | | | | | | | | | | |
| 15 | Toronto, Canada (west entrance) | 506 | 342 | 334 | 312 | 268 | 261 | 257 | 232 | 219 | 207 | 186 | 180 | 175 | 179 | 160 | 142 | 129 | 112 | 103 | 65 | 60 | | | | | | | | | | | | | |
| 16 | Port Hope, Canada | 449 | 289 | 281 | 259 | 215 | 208 | 204 | 179 | 166 | 154 | 132 | 126 | 121 | 125 | 106 | 85 | 72 | 56 | 47 | 7 | | | | | | | | | | | | | | |
| 17 | Cobourg, Canada | 444 | 283 | 275 | 253 | 209 | 202 | 198 | 173 | 160 | 148 | 127 | 120 | 116 | 120 | 101 | 79 | 67 | 50 | 41 | | | | | | | | | | | | | | | |
| 18 | Trenton, Canada | 417 | 255 | 247 | 225 | 181 | 174 | 170 | 145 | 132 | 120 | 101 | 94 | 90 | 89 | 71 | 40 | 28 | 11 | | | | | | | | | | | | | | | | |
| 19 | Belleville, Canada | 406 | 244 | 236 | 214 | 170 | 163 | 158 | 134 | 121 | 109 | 90 | 84 | 80 | 78 | 60 | 29 | 17 | | | | | | | | | | | | | | | | | |
| 20 | Deseronto, Canada | 390 | 228 | 220 | 198 | 154 | 147 | 143 | 118 | 105 | 93 | 74 | 68 | 63 | 62 | 44 | 13 | | | | | | | | | | | | | | | | | | |
| 21 | Picton, Canada | 383 | 222 | 214 | 192 | 148 | 141 | 137 | 112 | 99 | 87 | 66 | 62 | 57 | 56 | 37 | | | | | | | | | | | | | | | | | | | |
| 22 | Kingston, Canada | 346 | 185 | 177 | 155 | 111 | 104 | 100 | 75 | 62 | 50 | 32 | 25 | 21 | 19 | | | | | | | | | | | | | | | | | | | | |
| 23 | Gananoque, Canada | 327 | 167 | 159 | 137 | 93 | 86 | 82 | 57 | 44 | 32 | 18 | 11 | 10 | | | | | | | | | | | | | | | | | | | | | |
| 24 | Clayton, N.Y. | 327 | 167 | 159 | 137 | 93 | 86 | 82 | 57 | 44 | 32 | 11 | 4 | | | | | | | | | | | | | | | | | | | | | | |
| 25 | Thousand Island Park, N.Y. | 326 | 164 | 156 | 134 | 90 | 83 | 79 | 54 | 41 | 29 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | Alexandria Bay, N.Y. | 317 | 156 | 148 | 127 | 83 | 76 | 72 | 46 | 33 | 22 | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | Brockville, Canada | 295 | 135 | 127 | 105 | 61 | 54 | 50 | 25 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Ogdensburg, N.Y. | 283 | 123 | 115 | 93 | 49 | 42 | 38 | 13 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | Iroquois Lock, Canada | 270 | 110 | 102 | 80 | 36 | 29 | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | Eisenhower Lock, N.Y. | 245 | 85 | 77 | 55 | 11 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | Snell Lock, N.Y. | 241 | 81 | 73 | 51 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | Coteau Island, Canada | 233 | 74 | 66 | 44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | Beauharnois Lock, Canada | 190 | 30 | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | Cote St. Catherine Lock, Canada | 168 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | Montreal, St. Lambert Lock, Canada | 160 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | Quebec, Canada | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(a) From sailing course point north of Old Mackinac Point

(b) From foot of Grand River Ave. to Toronto west entrance

EXPLANATION

Points in this table are arranged in geographical sequence proceeding westward along the south shore and returning eastward along the north shore of the lake and down St. Lawrence River.

# DISTANCES BETWEEN POINTS ON LAKE ERIE AND ST. CLAIR, DETROIT, AND NIAGARA RIVERS

(Statute Miles)

| | | 37 | 36 | 35 | 34 | 33 | 32 | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Kingsville | Rondeau | Port Stanley | Port Burwell | Port Dover | Port Maitland | Niagara Falls | Tonawanda | Buffalo | Dunkirk | Erie | Conneaut | Ashtabula | Fairport | Cleveland | Lorain | Vermilion | Huron | Sandusky | Put-in-Bay | Port Clinton | Toledo | Monroe | Detroit River Light | Amherstburg | Trenton | Wyandotte | Detroit | Chatham | Mt. Clemens | St. Clair Flats | Algonac | Marine City | St. Clair | Port Huron | Port Colborne |
| 1 | OLD MACKINAC POINT (a) | 356 | 414 | 459 | 475 | 527 | 536 | 588 | 580 | 569 | 536 | 500 | 473 | 460 | 435 | 417 | 396 | 391 | 387 | 360 | 363 | 369 | 363 | 348 | 334 | 326 | 324 | 320 | 309 | 322 | 296 | 286 | 274 | 266 | 259 | 247 | 553 |
| 2 | PORT COLBORNE | 201 | 146 | 109 | 89 | 52 | 18 | 41 | 33 | 22 | 25 | 65 | 92 | 104 | 130 | 160 | 180 | 190 | 198 | 204 | 204 | 213 | 237 | 227 | 219 | 227 | 229 | 234 | 244 | 292 | 278 | 267 | 261 | 267 | 264 | 306 | |
| 3 | PORT HURON (b) | 111 | 167 | 212 | 228 | 280 | 291 | 341 | 333 | 322 | 292 | 253 | 226 | 213 | 188 | 170 | 152 | 144 | 140 | 133 | 116 | 122 | 116 | 101 | 87 | 79 | 77 | 73 | 62 | 75 | 49 | 39 | 27 | 19 | 12 | | |
| 4 | St. Clair, Mich. | 99 | 155 | 200 | 216 | 268 | 279 | 330 | 322 | 311 | 281 | 241 | 214 | 201 | 176 | 158 | 141 | 133 | 126 | 122 | 105 | 111 | 105 | 89 | 75 | 67 | 65 | 61 | 50 | 63 | 37 | 27 | 15 | 7 | | | |
| 5 | Marine City, Mich. | 92 | 148 | 193 | 209 | 261 | 272 | 322 | 314 | 303 | 273 | 234 | 207 | 194 | 169 | 151 | 133 | 125 | 121 | 114 | 97 | 103 | 97 | 82 | 68 | 60 | 58 | 54 | 43 | 56 | 30 | 20 | 7 | | | | |
| 6 | Algonac, Mich. | 86 | 143 | 188 | 203 | 255 | 267 | 317 | 309 | 298 | 268 | 228 | 201 | 188 | 163 | 145 | 128 | 120 | 116 | 109 | 92 | 98 | 92 | 76 | 62 | 55 | 53 | 48 | 37 | 49 | 22 | 14 | | | | | |
| 7 | St. Clair Flats, Mich., Canada (c) | 72 | 129 | 174 | 189 | 241 | 253 | 303 | 295 | 284 | 254 | 215 | 187 | 174 | 149 | 131 | 114 | 108 | 102 | 95 | 78 | 84 | 78 | 62 | 48 | 41 | 39 | 34 | 23 | 35 | 15 | | | | | | |
| 8 | Mount Clemens, Mich. | 83 | 140 | 185 | 200 | 252 | 264 | 314 | 306 | 295 | 265 | 226 | 199 | 185 | 161 | 142 | 125 | 117 | 113 | 106 | 89 | 95 | 89 | 73 | 59 | 53 | 50 | 45 | 35 | 49 | | | | | | | |
| 9 | Chatham, Canada | 97 | 154 | 199 | 214 | 265 | 278 | 326 | 320 | 309 | 279 | 239 | 212 | 198 | 174 | 156 | 139 | 130 | 127 | 120 | 102 | 108 | 102 | 87 | 73 | 66 | 63 | 59 | 48 | | | | | | | | |
| 10 | Detroit, Mich. (Woodward Ave.) | 49 | 106 | 151 | 166 | 217 | 230 | 280 | 272 | 261 | 231 | 191 | 164 | 150 | 126 | 108 | 91 | 82 | 79 | 72 | 54 | 60 | 54 | 39 | 25 | 18 | 15 | 11 | | | | | | | | | |
| 11 | Wyandotte, Mich. | 39 | 96 | 141 | 156 | 208 | 220 | 270 | 262 | 251 | 221 | 182 | 154 | 141 | 116 | 98 | 81 | 73 | 69 | 62 | 45 | 51 | 45 | 29 | 15 | 8 | 5 | | | | | | | | | | |
| 12 | Trenton, Mich. | 34 | 91 | 136 | 151 | 203 | 215 | 265 | 257 | 246 | 216 | 177 | 149 | 136 | 111 | 93 | 76 | 68 | 64 | 57 | 40 | 46 | 40 | 24 | 10 | 13 | | | | | | | | | | | |
| 13 | Amherstburg, Canada | 31 | 88 | 133 | 148 | 200 | 212 | 262 | 254 | 243 | 213 | 173 | 146 | 133 | 108 | 90 | 73 | 64 | 61 | 54 | 36 | 42 | 36 | 21 | 7 | | | | | | | | | | | | |
| 14 | Detroit River Light, Mich. | 24 | 81 | 126 | 141 | 193 | 205 | 255 | 247 | 236 | 206 | 166 | 139 | 126 | 101 | 83 | 66 | 58 | 54 | 47 | 30 | 36 | 30 | 14 | | | | | | | | | | | | | |
| 15 | Monroe, Mich. (piers) | 33 | 89 | 134 | 149 | 200 | 213 | 263 | 255 | 244 | 214 | 174 | 147 | 133 | 109 | 89 | 68 | 60 | 54 | 46 | 30 | 35 | 21 | | | | | | | | | | | | | | |
| 16 | Toledo, Ohio (river mouth) | 45 | 98 | 143 | 159 | 210 | 223 | 272 | 265 | 254 | 224 | 185 | 157 | 144 | 119 | 96 | 72 | 65 | 59 | 52 | 39 | 40 | | | | | | | | | | | | | | | |
| 17 | Port Clinton, Ohio | 37 | 75 | 120 | 136 | 187 | 199 | 249 | 241 | 230 | 200 | 160 | 131 | 118 | 92 | 67 | 43 | 36 | 29 | 22 | 12 | | | | | | | | | | | | | | | | |
| 18 | Put-in-Bay, Ohio | 27 | 66 | 111 | 127 | 177 | 190 | 240 | 232 | 221 | 190 | 150 | 122 | 109 | 83 | 61 | 38 | 32 | 27 | 21 | | | | | | | | | | | | | | | | | |
| 19 | Sandusky, Ohio (wharves) | 41 | 69 | 114 | 130 | 178 | 190 | 239 | 232 | 221 | 189 | 149 | 120 | 107 | 79 | 55 | 29 | 21 | 14 | | | | | | | | | | | | | | | | | | |
| 20 | Huron, Ohio | 47 | 68 | 111 | 124 | 172 | 184 | 233 | 226 | 215 | 183 | 142 | 113 | 99 | 72 | 47 | 20 | 11 | | | | | | | | | | | | | | | | | | | |
| 21 | Vermilion, Ohio | 46 | 62 | 104 | 117 | 163 | 175 | 225 | 217 | 206 | 174 | 133 | 104 | 90 | 63 | 37 | 11 | | | | | | | | | | | | | | | | | | | | |
| 22 | Lorain, Ohio | 48 | 57 | 97 | 109 | 154 | 166 | 215 | 208 | 197 | 164 | 124 | 95 | 80 | 53 | 28 | | | | | | | | | | | | | | | | | | | | | |
| 23 | Cleveland, Ohio (main entrance) | 65 | 53 | 85 | 93 | 134 | 146 | 194 | 187 | 176 | 143 | 102 | 73 | 59 | 33 | | | | | | | | | | | | | | | | | | | | | | |
| 24 | Fairport, Ohio | 83 | 48 | 52 | 66 | 104 | 116 | 165 | 157 | 146 | 114 | 73 | 44 | 30 | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | Ashtabula, Ohio | 108 | 63 | 56 | 47 | 79 | 90 | 138 | 130 | 119 | 86 | 45 | 15 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | Conneaut, Ohio | 122 | 74 | 59 | 48 | 68 | 80 | 126 | 118 | 107 | 74 | 33 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | Erie, Pa. | 148 | 96 | 70 | 53 | 47 | 54 | 98 | 89 | 78 | 45 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Dunkirk, N.Y. | 168 | 134 | 98 | 78 | 50 | 28 | 55 | 48 | 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | Buffalo, N.Y. | 218 | 163 | 126 | 106 | 72 | 36 | 21 | 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | Tonawanda, N.Y. | 230 | 174 | 137 | 117 | 83 | 49 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | Niagara Falls, N.Y. | 237 | 182 | 145 | 125 | 90 | 57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | Port Maitland, Canada | 187 | 132 | 96 | 75 | 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | Port Dover, Canada | 175 | 120 | 83 | 62 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | Port Burwell, Canada | 123 | 65 | 23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | Port Stanley, Canada | 108 | 49 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | Rondeau, Canada | 63 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | Kingsville, Canada | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(a) From sailing course point north of Old Mackinac Point

(b) From foot of Grand River Ave.

(c) From south end of canal dike

EXPLANATION

Points in this table are arranged in geographical sequence proceeding southward in St. Clair River and Lake and Detroit River, eastward along the south shore of Lake Erie to Niagara River, and returning westward along the north lake shore.

# DISTANCES BETWEEN POINTS ON LAKE HURON AND ST. MARYS RIVER

(Statute Miles)

| | | 38 Thessalon | 37 Algoma Mills | 36 Gore Bay | 35 Little Current | 34 Killarney | 33 French River | 32 Key Harbor | 31 Byng Inlet | 30 Parry Sound | 29 Depot Harbor | 28 Victoria Harbor | 27 Midland | 26 Penetanguishene | 25 Collingwood | 24 Meaford | 23 Owen Sound | 22 Wiarton | 21 Southampton | 20 Kincardine | 19 Goderich | 18 Port Stanley | 17 Harbor Beach | 16 Saginaw | 15 Bay City | 14 East Tawas | 13 Au Sable | 12 Alpena | 11 Rockport | 10 Stonepoint | 9 Rogers City | 8 Cheboygan | 7 Mackinac Island | 6 St. Ignace | 5 Port Dolomite | 4 De Tour | 3 Sault Ste. Marie | 2 Old Mackinac Point |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PORT HURON[a] | *236 | +238 | +250 | 225 | 213 | 224 | 232 | 229 | 247 | 243 | 267 | 266 | 266 | 269 | 241 | 239 | 229 | 121 | 94 | 65 | 33 | 63 | 175 | 162 | 119 | 117 | 157 | 166 | 162 | 194 | 233 | 243 | 247 | 239 | 224 | 269 | 247 |
| 2 | OLD MACKINAC POINT[b] | 69 | *101 | *116 | *143 | *167 | *186 | *205 | *211 | 235 | 231 | 256 | 256 | 254 | 247 | 230 | 227 | 217 | 189 | 192 | 211 | 215 | 186 | 223 | 210 | 183 | 142 | 115 | 63 | 78 | 54 | 16 | 7 | 6 | 27 | 45 | 90 | |
| 3 | SAULT STE. MARIE[c] | &48 | &88 | &106 | &131 | &155 | &184 | &193 | &201 | &242 | +239 | 268 | 267 | 266 | 269 | 242 | 239 | 229 | 207 | 213 | 234 | 239 | 209 | 246 | 232 | 186 | 165 | 137 | 107 | 86 | 84 | 84 | 94 | 90 | 68 | 45 | | |
| 4 | DeTour, Mich. | %34 | %56 | %76 | %101 | %125 | %154 | %163 | %171 | 201 | 196 | 224 | 222 | 221 | 214 | 197 | 194 | 185 | 162 | 188 | 189 | 193 | 184 | 201 | 187 | 140 | 120 | 92 | 61 | 61 | 40 | 39 | 39 | 44 | 23 | | | |
| 5 | Port Dolomite, Mich. | +92 | +90 | +106 | +135 | 189 | 197 | 199 | 196 | 218 | 215 | 243 | 241 | 239 | 233 | 220 | 219 | 207 | 176 | 183 | 203 | 218 | 190 | 219 | 206 | 182 | 143 | 113 | 76 | 70 | 47 | 31 | 26 | 28 | | | | |
| 6 | St. Ignace, Mich. | %69 | *100 | *116 | *142 | *166 | *195 | *204 | *209 | 234 | 231 | 256 | 254 | 252 | 246 | 229 | 227 | 217 | 191 | 194 | 214 | 218 | 187 | 224 | 210 | 183 | 143 | 115 | 83 | 82 | 56 | 20 | 6 | | | | | |
| 7 | Mackinac Island, Mich. | %63 | *95 | *110 | *137 | *161 | *190 | *199 | *204 | 229 | 226 | 251 | 249 | 248 | 241 | 224 | 221 | 212 | 186 | 189 | 209 | 212 | 184 | 220 | 207 | 159 | 140 | 111 | 79 | 77 | 50 | 17 | | | | | | |
| 8 | Cheboygan, Mich. | %63 | *92 | *108 | *133 | *157 | *186 | *195 | *197 | 221 | 217 | 242 | 241 | 240 | 233 | 216 | 213 | 204 | 175 | 178 | 198 | 202 | 173 | 210 | 198 | 149 | 129 | 101 | 69 | 66 | 40 | | | | | | | |
| 9 | Rogers City, Mich. | *63 | +74 | +87 | +114 | +138 | 157 | 169 | 164 | 187 | 183 | 208 | 208 | 206 | 199 | 182 | 177 | 169 | 139 | 142 | 161 | 163 | 134 | 171 | 157 | 110 | 90 | 61 | 31 | 27 | | | | | | | | |
| 10 | Stonepoint, Mich. | +75 | +73 | +92 | +118 | 137 | 146 | 147 | 147 | 166 | 163 | 190 | 189 | 188 | 181 | 164 | 163 | 151 | 115 | 120 | 146 | 158 | 130 | 154 | 141 | 87 | 76 | 48 | 9 | | | | | | | | | |
| 11 | Rockport, Mich. | *76 | +79 | +92 | +119 | 123 | 136 | 143 | 143 | 166 | 162 | 187 | 186 | 185 | 178 | 161 | 156 | 148 | 112 | 113 | 132 | 134 | 106 | 142 | 129 | 82 | 62 | 31 | | | | | | | | | | |
| 12 | Alpena, Mich. | *107 | +107 | +120 | +143 | 131 | 145 | 151 | 152 | 174 | 171 | 196 | 193 | 192 | 185 | 166 | 166 | 158 | 109 | 107 | 124 | 125 | 97 | 129 | 116 | 69 | 40 | | | | | | | | | | | |
| 13 | Au Sable, Mich. | *135 | +136 | +148 | 158 | 146 | 160 | 169 | 166 | 189 | 180 | 204 | 202 | 201 | 189 | 177 | 174 | 166 | 98 | 95 | 93 | 88 | 58 | 83 | 69 | 21 | | | | | | | | | | | | |
| 14 | East Tawas, Mich. | *155 | +156 | +168 | 175 | 163 | 176 | 180 | 182 | 199 | 196 | 220 | 218 | 217 | 210 | 194 | 190 | 181 | 110 | 94 | 95 | 88 | 60 | 68 | 54 | | | | | | | | | | | | | |
| 15 | Bay City, Mich. | *202 | +202 | +216 | 222 | 210 | 223 | 226 | 229 | 245 | 243 | 267 | 265 | 264 | 257 | 240 | 237 | 229 | 169 | 136 | 137 | 130 | 102 | 13 | | | | | | | | | | | | | | |
| 16 | Saginaw, Mich. | *216 | +216 | +229 | 235 | 223 | 237 | 242 | 242 | 258 | 256 | 280 | 278 | 278 | 271 | 254 | 250 | 241 | 167 | 149 | 151 | 144 | 115 | | | | | | | | | | | | | | | |
| 17 | Harbor Beach, Mich. | *178 | +178 | +191 | 171 | 159 | 171 | 178 | 176 | 194 | 190 | 214 | 213 | 212 | 205 | 188 | 185 | 175 | 79 | 56 | 47 | 32 | | | | | | | | | | | | | | | | |
| 18 | Port Sanilac, Mich. | *207 | +207 | +219 | 197 | 185 | 198 | 201 | 201 | 219 | 215 | 239 | 238 | 237 | 230 | 213 | 210 | 200 | 97 | 70 | 47 | | | | | | | | | | | | | | | | | |
| 19 | Goderich, Canada | +199 | +198 | 204 | 189 | 159 | 172 | 172 | 174 | 192 | 189 | 213 | 211 | 210 | 207 | 187 | 183 | 174 | 64 | 36 | | | | | | | | | | | | | | | | | | |
| 20 | Kincardine, Canada | +173 | +174 | 174 | 141 | 129 | 142 | 149 | 144 | 162 | 158 | 182 | 181 | 180 | 175 | 156 | 153 | 144 | 30 | | | | | | | | | | | | | | | | | | | |
| 21 | Southampton, Canada | +169 | +166 | 156 | 122 | 110 | 123 | 130 | 126 | 143 | 140 | 163 | 162 | 161 | 157 | 137 | 134 | 125 | | | | | | | | | | | | | | | | | | | | |
| 22 | Wiarton, Canada[d] | +186 | 158 | 142 | 110 | 94 | 86 | 79 | 81 | 74 | 71 | 76 | 74 | 73 | 63 | 36 | 29 | | | | | | | | | | | | | | | | | | | | | |
| 23 | Owen Sound, Canada[d] | +197 | 167 | 152 | 118 | 103 | 97 | 97 | 89 | 79 | 75 | 71 | 70 | 69 | 46 | 29 | | | | | | | | | | | | | | | | | | | | | | |
| 24 | Meaford, Canada[d] | +200 | 169 | 153 | 121 | 105 | 96 | 96 | 86 | 71 | 68 | 65 | 63 | 62 | 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | Collingwood, Canada[d] | +217 | 186 | 171 | 138 | 120 | 108 | 107 | 97 | 80 | 76 | 57 | 55 | 54 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | Penetanguishene, Canada[d] | +224 | 187 | 172 | 139 | 120 | 106 | 104 | 94 | 72 | 69 | 12 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | Midland, Canada[d] | +225 | 186 | 173 | 140 | 121 | 107 | 105 | 95 | 73 | 70 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Port McNicoll, Canada[d] | +227 | 190 | 174 | 142 | 122 | 108 | 106 | 97 | 78 | 71 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | Depot Harbor, Canada[d] | 193 | 156 | 140 | 107 | 87 | 73 | 71 | 62 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | Parry Sound, Canada[d] | 187 | 156 | 143 | 111 | 91 | 77 | 75 | 65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | Byng Inlet, Canada[d] | 155 | 116 | 102 | 70 | 50 | 31 | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | Key Harbor, Canada[d] | 146 | 110 | 94 | 62 | 42 | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | French River, Canada[d] | 138 | 101 | 86 | 53 | 33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | Killarney, Canada[d] | 110 | 72 | 56 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | Little Current, Canada | 86 | 46 | 33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | Gore Bay, Canada | 61 | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | Algoma Mills, Canada | 43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 | Thessalon, Canada | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(a) From foot of Grand River Avenue.

(b) From sailing course point north of Old Mackinac Point.

(c) From abreast east end of U.S. center pier, and (except those marked &) via Middle Neebish and De Tour; distances downbound through West Neebish are 1 mile less.

(d) Distances to Georgian Bay ports (except those marked *, +, &, %) are via the bay entrance from Lake Huron and St. Marys River points and via Little Current from North Channel points.

* Via False Detour and North Channels.

\+ Via Mississagi Strait and North Channel.

& Via Lake Nicolet, St. Joseph, and North Channels.

% Via Potagannissing Bay and North Channel.

EXPLANATION

Points in this table are arranged in geographical sequence proceeding from St. Marys River southward along the west shore, and returning northward up the east shore, around Georgian Bay, and westward through North Channel.

# DISTANCES BETWEEN POINTS ON LAKE MICHIGAN

(Statute Miles)

| | | 38 Beaver Island Harbor | 37 Petoskey | 36 Charlevoix | 35 Traverse City | 34 Frankfort | 33 Portage Lake | 32 Manistee | 31 Ludington | 30 Pentwater | 29 White Lake | 28 Muskegon | 27 Grand Haven | 26 Holland | 25 Saugatuck | 24 South Haven | 23 St. Joseph | 22 Michigan City | 21 Gary | 20 Indiana Harbor | 19 South Chicago | 18 Chicago | 17 Waukegan | 16 Kenosha | 15 Racine | 14 Milwaukee | 13 Port Washington | 12 Sheboygan | 11 Manitowoc | 10 Two Rivers | 9 Kewaunee | 8 Algoma | 7 Sturgeon Bay | 6 Green Bay | 5 Menominee | 4 Escanaba | 3 Manistique | 2 Port Inland |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | OLD MACKINAC POINT[a] | 41 | 55 | 56 | 97 | 122 | 142 | 160 | 173 | 184 | 213 | 224 | 236 | 257 | 265 | 261 | 300 | 325 | 336 | 334 | 333 | 324 | 296 | 292 | 272 | 259 | 237 | 212 | 191 | 187 | 170 | 161 | 155 | 186 | 156 | 129 | 75 | 59 |
| 2 | Port Inland, Mich. | 31 | 66 | 58 | 88 | 96 | 116 | 123 | 146 | 157 | 186 | 187 | 211 | 229 | 236 | 253 | 271 | 298 | 314 | 308 | 304 | 298 | 270 | 254 | 245 | 228 | 204 | 179 | 161 | 152 | 131 | 124 | 110 | 146 | 104 | 78 | 23 | |
| 3 | Manistique, Mich. | 43 | 76 | 84 | 94 | 91 | 110 | 118 | 141 | 152 | 182 | 193 | 207 | 225 | 232 | 250 | 288 | 294 | 303 | 301 | 298 | 290 | 260 | 244 | 235 | 220 | 196 | 168 | 146 | 142 | 120 | 111 | 103 | 126 | 92 | 66 | | |
| 4 | Escanaba, Mich. | 69 | 113 | 99 | 120 | 91 | 106 | 112 | 130 | 141 | 170 | 181 | 195 | 213 | 220 | 236 | 253 | 280 | 286 | 286 | 283 | 274 | 242 | 226 | 217 | 201 | 176 | 149 | 127 | 122 | 100 | 90 | 69 | 101 | 56 | | | |
| 5 | Menominee, Mich. & Wis.[b] | *122 | *134 | *119 | *139 | 80 | 96 | 87 | 98 | 108 | 136 | 146 | 159 | 177 | 183 | 200 | 219 | 239 | 246 | 243 | 240 | 230 | 198 | 184 | 172 | 155 | 130 | 103 | 81 | 75 | 52 | 43 | 22 | 49 | | | | |
| 6 | Green Bay, Wis. (city)[b] | *166 | 176 | 160 | 178 | 105 | 111 | 112 | 123 | 134 | 158 | 171 | 184 | 202 | 209 | 225 | 242 | 264 | 272 | 266 | 265 | 255 | 223 | 209 | 197 | 180 | 156 | 126 | 106 | 101 | 78 | 68 | 47 | | | | | |
| 7 | Sturgeon Bay, Wis. (town) | 123 | 129 | 113 | 131 | 88 | 84 | 66 | 76 | 87 | 113 | 124 | 137 | 155 | 162 | 178 | 196 | 217 | 228 | 222 | 218 | 208 | 176 | 162 | 150 | 133 | 108 | 81 | 58 | 54 | 30 | 21 | | | | | | |
| 8 | Algoma, Wis. | 131 | 135 | 119 | 136 | 89 | 80 | 58 | 66 | 75 | 100 | 111 | 123 | 142 | 148 | 163 | 179 | 200 | 206 | 203 | 200 | 190 | 158 | 142 | 132 | 116 | 89 | 62 | 40 | 36 | 12 | | | | | | | |
| 9 | Kewaunee, Wis. | 138 | 143 | 126 | 143 | 82 | 80 | 58 | 61 | 70 | 93 | 104 | 116 | 136 | 141 | 156 | 171 | 192 | 197 | 194 | 191 | 181 | 149 | 133 | 123 | 105 | 79 | 53 | 31 | 26 | | | | | | | | |
| 10 | Two Rivers, Wis. | 156 | 159 | 142 | 160 | 75 | 67 | 62 | 57 | 61 | 78 | 88 | 101 | 118 | 123 | 137 | 151 | 170 | 174 | 171 | 168 | 158 | 125 | 109 | 100 | 82 | 56 | 29 | 6 | | | | | | | | | |
| 11 | Manitowoc, Wis. | 161 | 163 | 147 | 164 | 79 | 71 | 56 | 60 | 64 | 78 | 90 | 102 | 119 | 123 | 137 | 150 | 169 | 173 | 169 | 166 | 156 | 123 | 107 | 97 | 79 | 53 | 26 | | | | | | | | | | |
| 12 | Sheboygan, Wis. | 180 | 181 | 165 | 182 | 96 | 83 | 76 | 80 | 83 | 88 | 78 | 87 | 102 | 106 | 116 | 130 | 146 | 149 | 146 | 143 | 132 | 99 | 83 | 74 | 55 | 29 | | | | | | | | | | | |
| 13 | Port Washington, Wis. | 206 | 205 | 189 | 206 | 119 | 104 | 98 | 80 | 76 | 72 | 77 | 84 | 94 | 97 | 106 | 112 | 124 | 125 | 121 | 118 | 107 | 74 | 58 | 48 | 29 | | | | | | | | | | | | |
| 14 | Milwaukee, Wis. | 229 | 227 | 211 | 228 | 140 | 125 | 117 | 97 | 91 | 76 | 80 | 83 | 88 | 89 | 93 | 98 | 104 | 103 | 99 | 96 | 85 | 51 | 35 | 26 | | | | | | | | | | | | | |
| 15 | Racine, Wis. | 242 | 241 | 225 | 242 | 153 | 137 | 129 | 106 | 100 | 81 | 80 | 80 | 79 | 80 | 80 | 78 | 84 | 83 | 78 | 75 | 64 | 30 | 14 | | | | | | | | | | | | | | |
| 16 | Kenosha, Wis. | 252 | 251 | 234 | 252 | 163 | 147 | 138 | 117 | 108 | 86 | 87 | 88 | 82 | 82 | 79 | 75 | 76 | 73 | 67 | 64 | 54 | 16 | | | | | | | | | | | | | | | |
| 17 | Waukegan, Ill. | 289 | 285 | 248 | 288 | 177 | 160 | 152 | 130 | 122 | 100 | 96 | 96 | 86 | 84 | 78 | 70 | 64 | 58 | 52 | 49 | 38 | | | | | | | | | | | | | | | | |
| 18 | Chicago, Ill. | 294 | 293 | 276 | 293 | 204 | 186 | 179 | 158 | 146 | 120 | 114 | 108 | 95 | 90 | 77 | 68 | 38 | 25 | 18 | 15 | | | | | | | | | | | | | | | | | |
| 19 | South Chicago, Ill. | 302 | 301 | 285 | 302 | 213 | 188 | 188 | 166 | 154 | 127 | 120 | 114 | 100 | 95 | 79 | 69 | 33 | 14 | 7 | | | | | | | | | | | | | | | | | | |
| 20 | Indiana Harbor, Ind. | 304 | 303 | 287 | 304 | 215 | 198 | 189 | 167 | 156 | 129 | 122 | 115 | 99 | 95 | 79 | 59 | 31 | 13 | | | | | | | | | | | | | | | | | | | |
| 21 | Gary, Ind. | 309 | 308 | 292 | 308 | 218 | 199 | 191 | 167 | 157 | 129 | 121 | 114 | 99 | 93 | 77 | 56 | 22 | | | | | | | | | | | | | | | | | | | | |
| 22 | Michigan City, Ind. | 286 | 284 | 278 | 286 | 208 | 189 | 181 | 157 | 146 | 117 | 108 | 98 | 82 | 75 | 57 | 36 | | | | | | | | | | | | | | | | | | | | | |
| 23 | St. Joseph, Mich. | 289 | 288 | 251 | 288 | 179 | 152 | 154 | 130 | 119 | 88 | 78 | 69 | 50 | 44 | 24 | | | | | | | | | | | | | | | | | | | | | | |
| 24 | South Haven, Mich. | 251 | 250 | 233 | 250 | 161 | 144 | 136 | 111 | 101 | 39 | 58 | 49 | 29 | 22 | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | Saugatuck, Mich. | 232 | 231 | 215 | 232 | 143 | 126 | 118 | 93 | 83 | 51 | 40 | 29 | 8 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | Holland, Mich. | 227 | 226 | 210 | 227 | 137 | 120 | 112 | 88 | 77 | 45 | 34 | 23 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | Grand Haven, Mich. | 206 | 205 | 189 | 206 | 117 | 100 | 92 | 67 | 57 | 25 | 13 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Muskegon, Mich. | 185 | 184 | 178 | 185 | 106 | 89 | 80 | 58 | 46 | 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | White Lake, Mich. | 184 | 183 | 167 | 184 | 95 | 78 | 69 | 46 | 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | Pentwater, Mich. | 154 | 153 | 137 | 154 | 65 | 48 | 39 | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | Ludington, Mich. | 143 | 142 | 126 | 143 | 54 | 37 | 26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | Manistee, Mich. | 118 | 117 | 100 | 118 | 29 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | Portage Lake, Mich. | 110 | 109 | 93 | 110 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | Frankfort, Mich. | 93 | 92 | 75 | 92 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | Traverse City, Mich. | 69 | 58 | 45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | Charlevoix, Mich. | 33 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | Petoskey, Mich. | 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 | Beaver Island Harbor, Mich. | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(a) From sailing course point north of Old Mackinac Point.

(b) Distances from Menominee and Green Bay to Lake Michigan points except those marked (*) are via Sturgeon Bay Canal.

* Via Rock Island Passage.

EXPLANATION

Points in this table are arranged in geographical sequence proceeding southward along the west shore and returning northward along the east shore.

# DISTANCES BETWEEN POINTS ON LAKE SUPERIOR

(Statute Miles)

| | | 40 Gargantua Harbor | 39 Michipicoten Harbor | 37 Quebec Harbor | 36 Peninsula Harbor | 35 Rossport | 34 Thunder Bay (Ft. Arthur) | 33 Thunder Bay (Ft. William) | 32 Passage Island | 31 Rock of Ages | 30 Grand Marais, Minn. | 29 Taconite | 28 Silver Bay | 27 Two Harbors | 26 Duluth | 25 Superior | 24 Port Wing | 23 Bayfield | 22 Washburn | 21 Ashland | 20 Ontonagon | 19 Keweenaw W. Upper Ent. | 18 Houghton | 17 Dollar Bay | 16 Lake Linden | 15 Chassell | 14 Portage Entry | 13 Eagle Harbor | 12 Copper Harbor | 11 Mandota Canal | 10 L'Anse | 9 Huron Bay | 8 Marquette | 7 Munising | 6 Grand Marais, Mich. | 5 Whitefish Point | 4 Sault Ste. Marie |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PORT COLBORNE | 688 | 697 | 691 | 771 | 809 | 846 | 847 | 804 | 836 | 880 | 909 | 927 | 946 | 970 | 988 | 938 | 912 | 920 | 924 | 850 | 807 | 796 | 798 | 789 | 791 | 782 | 779 | 764 | 784 | 792 | 779 | 735 | 708 | 667 | 617 | 575 |
| 2 | PORT HURON[a] | 380 | 391 | 386 | 466 | 503 | 542 | 541 | 498 | 532 | 574 | 603 | 621 | 640 | 664 | 682 | 633 | 606 | 614 | 616 | 544 | 501 | 490 | 487 | 493 | 486 | 476 | 473 | 458 | 458 | 466 | 473 | 429 | 400 | 361 | 311 | 268 |
| 3 | OLD MACKINAC POINT[b] | 181 | 212 | 208 | 286 | 324 | 363 | 362 | 318 | 353 | 395 | 426 | 444 | 461 | 486 | 483 | 454 | 426 | 436 | 430 | 366 | 322 | 311 | 308 | 314 | 306 | 297 | 294 | 279 | 279 | 307 | 294 | 249 | 221 | 182 | 134 | 90 |
| 4 | SAULT STE. MARIE (21)[c] | 91 | 121 | 116 | 196 | 234 | 273 | 272 | 229 | 263 | 305 | 334 | 352 | 371 | 394 | 393 | 364 | 336 | 345 | 348 | *274 | *232 | 221 | 218 | 224 | 218 | 207 | 204 | 189 | 189 | 217 | 204 | 159 | 131 | 92 | 42 | |
| 5 | Whitefish Point, Mich. | 54 | 83 | 74 | 153 | 192 | 231 | 230 | 187 | 221 | 263 | 292 | 310 | 329 | 362 | 351 | 322 | 294 | 303 | 307 | *232 | *190 | 179 | 176 | 182 | 173 | 165 | 162 | 147 | 147 | 175 | 162 | 117 | 89 | 50 | | |
| 6 | Grand Marais, Mich. | 78 | 102 | 70 | 144 | 171 | 198 | 197 | 154 | 182 | 224 | 255 | 270 | *289 | *312 | *310 | *282 | *252 | *260 | *264 | *187 | *143 | 133 | 130 | 135 | 127 | 119 | 123 | 108 | 106 | 129 | 114 | 68 | 40 | | | |
| 7 | Munising, Mich. | 112 | 136 | 97 | 182 | 179 | 193 | 192 | 150 | 174 | *212 | 245 | 260 | *271 | *293 | *291 | *263 | *233 | *240 | *246 | *188 | *124 | 114 | 111 | 116 | 106 | 99 | 113 | 100 | 93 | 110 | 93 | 42 | | | | |
| 8 | Marquette, Mich. (docks) | 135 | 154 | 112 | 190 | 184 | 171 | 170 | 128 | *149 | *181 | 228 | 239 | *239 | *261 | *260 | *231 | *201 | *209 | *213 | *136 | *99 | 94 | 81 | 84 | 76 | 66 | 91 | 76 | 67 | 78 | 62 | | | | | |
| 9 | Huron Bay, Mich. (village) | 166 | 179 | 132 | 159 | 152 | 157 | 156 | 113 | *110 | *142 | *166 | *181 | *201 | *223 | *222 | *193 | *165 | *171 | *175 | *98 | *54 | 44 | 41 | 46 | 38 | 30 | 74 | 60 | 44 | 38 | | | | | | |
| 10 | L'Anse, Mich. | 179 | 192 | 148 | 189 | 182 | *146 | *144 | 108 | *95 | *127 | *161 | *168 | *186 | *208 | *206 | *178 | *148 | *156 | *160 | *83 | *39 | 29 | 26 | 31 | 23 | 14 | 70 | 71 | 51 | | | | | | | |
| 11 | Mandota Canal, Mich. | 138 | 152 | 105 | 125 | 117 | 122 | 121 | 78 | 103 | 145 | 172 | 190 | 212 | 234 | 232 | 204 | *174 | *182 | *186 | *110 | *69 | 55 | 52 | 58 | 50 | 41 | 42 | 27 | | | | | | | | |
| 12 | Copper Harbor, Mich. | 137 | 146 | 100 | 112 | 99 | 100 | 99 | 68 | 77 | 119 | 142 | 161 | 185 | 208 | 206 | 178 | 150 | 159 | 163 | 86 | 45 | 56 | 59 | 71 | 65 | 60 | 16 | | | | | | | | | |
| 13 | Eagle Harbor, Mich. | 151 | 158 | 114 | 122 | 102 | 96 | 95 | 53 | 85 | 105 | 129 | 148 | 170 | 194 | 192 | 163 | 135 | 143 | 147 | 72 | 31 | 41 | 45 | 57 | 50 | 58 | | | | | | | | | | |
| 14 | Portage Entry, Mich. | 166 | 181 | 135 | 157 | 148 | *130 | *129 | 94 | *81 | *113 | 136 | 153 | *171 | *193 | *192 | *163 | *133 | *141 | *145 | *68 | *25 | 14 | 11 | 17 | 9 | | | | | | | | | | | |
| 15 | Chassell, Mich. | 177 | 190 | 143 | 166 | 146 | 125 | 124 | 89 | 76 | 108 | 128 | 146 | 166 | 188 | 187 | 158 | 129 | 136 | 140 | 63 | 20 | 9 | 6 | 12 | | | | | | | | | | | | |
| 16 | Lake Linden, Mich. | 185 | 198 | 151 | 174 | 151 | 131 | 130 | 86 | 82 | 113 | 136 | 153 | 172 | 194 | 193 | 163 | 134 | 142 | 146 | 69 | 26 | 15 | 11 | | | | | | | | | | | | | |
| 17 | Dollar Bay, Mich. | 190 | 192 | 146 | 163 | 139 | 119 | 118 | 80 | 70 | 102 | 122 | 140 | 160 | 182 | 181 | 152 | 122 | 130 | 134 | 57 | 14 | 3 | | | | | | | | | | | | | | |
| 18 | Houghton, Mich. | 182 | 195 | 149 | 160 | 138 | 116 | 115 | 80 | 67 | 99 | 118 | 136 | 157 | 179 | 178 | 149 | 119 | 127 | 131 | 54 | 11 | | | | | | | | | | | | | | | |
| 19 | Keweenaw Waterway, Upper Entry, Mich. | 180 | 187 | 142 | 149 | 126 | 105 | 105 | 68 | 56 | 88 | 106 | 125 | 147 | 169 | 167 | 139 | 109 | 116 | 120 | 44 | | | | | | | | | | | | | | | | |
| 20 | Ontonagon, Mich. | 221 | 229 | 180 | 189 | 165 | 117 | 116 | 103 | 66 | 76 | 96 | 95 | 114 | 136 | 135 | 106 | 74 | 78 | 82 | | | | | | | | | | | | | | | | | |
| 21 | Ashland, Wis. | 286 | 304 | 258 | 261 | 227 | 164 | 163 | 165 | 115 | 65 | 77 | 92 | 71 | 93 | 92 | 63 | 16 | 5 | | | | | | | | | | | | | | | | | | |
| 22 | Washburn, Wis. | 291 | 300 | 254 | 258 | 222 | 160 | 159 | 161 | 111 | 61 | 72 | 87 | 87 | 99 | 98 | 59 | 12 | | | | | | | | | | | | | | | | | | | |
| 23 | Bayfield, Wis. | 282 | 291 | 248 | 254 | 221 | 149 | 148 | 152 | 98 | 70 | 80 | 45 | 57 | 78 | 77 | 49 | | | | | | | | | | | | | | | | | | | | |
| 24 | Port Wing, Wis. | 312 | 319 | 275 | 272 | 233 | 168 | 168 | 175 | 121 | 83 | 56 | 35 | 22 | 34 | 32 | | | | | | | | | | | | | | | | | | | | | |
| 25 | Superior, Wis. | 340 | 347 | 303 | 300 | 259 | 185 | 195 | 198 | 147 | 107 | 78 | 54 | 26 | 7 | | | | | | | | | | | | | | | | | | | | | | |
| 26 | Duluth, Minn. | 342 | 349 | 305 | 300 | 259 | 190 | 194 | 200 | 147 | 105 | 77 | 53 | 26 | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | Two Harbors, Minn. | 319 | 327 | 281 | 277 | 236 | 172 | 171 | 177 | 124 | 82 | 55 | 27 | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Silver Bay, Minn. | 300 | 302 | 260 | 260 | 210 | 145 | 142 | 156 | 100 | 55 | 26 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | Taconite, Minn. | 280 | 283 | 240 | 227 | 190 | 130 | 127 | 136 | 78 | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | Grand Marais, Minn. | 252 | 256 | 214 | 189 | 157 | 92 | 91 | 89 | 47 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | Rock of Ages, Mich. | 208 | 213 | 171 | 155 | 112 | 49 | 48 | 53 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | Passage Island, Mich. | 184 | 186 | 127 | 102 | 63 | 44 | 43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | Thunder Bay (Ft. William), Canada | 207 | 209 | 170 | 141 | 101 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | Thunder Bay (Ft. Arthur), Canada | 208 | 209 | 171 | 142 | 102 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | Rossport, Canada | 157 | 155 | 125 | 71 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | Peninsula Harbor, Canada | 114 | 112 | 86 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | Quebec Harbor, Canada | 41 | 49 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 | Michipicoten Harbor, Canada | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | Gargantua Harbor, Canada | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(a) From foot of Grand River Avenue

(b) From sailing course point north of Old Mackinac Point.

(c) From abeam of east end of United States center pier.

* Via Keweenaw Waterway.

EXPLANATION

Points in this table are arranged in geographical sequence proceeding westward along the south shore and returning eastward around the north shore.

# ILLINOIS WATERWAY CHANNELS AND DISTANCES TABLE

(Statute Miles)

| No. | Name of channel | Length of connecting channel | From lake shore, Wilmette Harbor* | From east end of north pier, Chicago Harbor | From east end of north pier, Calumet Harbor |
|---|---|---|---|---|---|
| | | Miles | Miles | Miles | Miles |
| 1 | North Shore Channel-From Wilmette Harbor | 8.1 | | | |
| | To connection with North Branch of Chicago River | ..... | 8.1 | 9 | 59.3 |
| 2 | Chicago River, North Branch-From North Shore Channel | 7.3 | | | |
| | To junction of branches and main channel | ..... | 15.5 | 1.6 | 52 |
| 3 | Chicago River, Main Channel-From junction of branches | 1.6 | | | |
| | To east end of north pier, Chicago Harbor | ..... | 17 | 0 | 53.6 |
| 4 | Chicago River, South Branch-From junction of branches | 3.9 | | | |
| | West Fork of South Branch | 0.6 | | | |
| | To connection with Sanitary and Ship Canal (No. 8-a) | ..... | 20 | 6.1 | 47.5 |
| 5 | Calumet River-From east end of north pier, Calumet Harbor | 7.7 | 67.5 | 53.6 | |
| 6 | Little Calumet River-West from Calumet River cutoff channel | 6 | 59.8 | 45.9 | 7.7 |
| 7 | Calumet-Sag Channel-From Little Calumet River connection | 16.2 | 53.8 | 39.9 | 13.7 |
| | To connection with Sanitary and Ship Canal (No. 8-b) | ..... | 37.6 | 23.7 | 29.9 |
| 8 | Chicago Sanitary and Ship Canal: | | | | |
| | (a) From West Fork of South Branch, Chicago River (No. 4) | 30 | | | |
| | (b) From Calumet-Sag Channel connection (No. 7) | 12.4 | | | |
| | To connection with Des Plaines River, Lockport Lock | ..... | 50 | 36.1 | 42.3 |
| 9 | Des Plaines River-From Lockport Lock | 18.1 | | | |
| | To head of Illinois River | ..... | 68.1 | 54.3 | 60.5 |
| 10 | Illinois River-From head of river | 272.9 | | | |
| | To mouth at Mississippi River | ..... | 341.1 | 327.2 | 333.4 |
| 11 | Illinois River-From head of river | 62.7 | | | |
| | To connection of Illinois and Mississippi Canal (No. 12) | ..... | 130.9 | 117 | 123.2 |
| 12 | Illinois and Mississippi Canal-From Illinois River** | 75 | | | |
| | To Mississippi River at mouth of Rock River | ..... | 205.9 | 192 | 198.1 |

*The Metropolitan Sanitary District of Greater Chicago lock at Wilmette Harbor is not operated for navigation.

**As of July 1, 1951, operation of the lock on the Illinois and Mississippi (Hennepin) Canal and maintenance of the Canal was discontinued.

## DISTANCES ON NEW YORK STATE WATERWAYS
(Statute Miles)

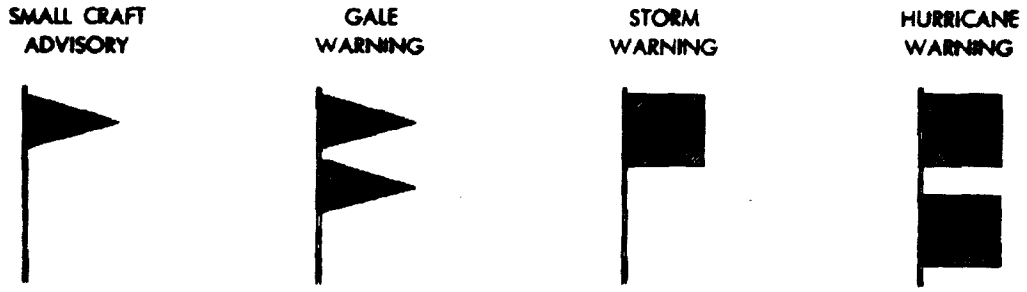
| City and local point | From Buffalo, Erie Basin | From Oswego, Lake Terminal | From Troy Lock |
|---|---|---|---|
| Erie Canal | Miles | Miles | Miles |
| Buffalo-Erie Basin | ..... | 214.2 | 353.3 |
| Tonawanda-Terminal | 12.9 | 201.3 | 340.3 |
| Lockport-Lower Terminal | 30.9 | 183.3 | 322.3 |
| Rochester | 93.9 | 126.9 | 265.9 |
| Newark-Dock | 124.3 | 89.9 | 228.9 |
| Syracuse-Terminal | 190.1 | 37.2 | 176.2 |
| Rome-Terminal | 235.9 | 69.1 | 117.3 |
| Utica-Terminal | 249.9 | 83.1 | 104.9 |
| Little Falls-Terminal | 270.8 | 104.0 | 82.5 |
| Amsterdam-Terminal | 313.3 | 146.5 | 40.0 |
| Schenectady | 330.1 | 163.3 | 23.8 |
| Cohoes | 351.6 | 184.8 | 1.7 |
| Troy Lock | 353.3 | 186.5 | ..... |
| Cayuga and Seneca Canal | | | |
| Watkins Glen | 201.4 | 116.8 | 255.9 |
| Ithaca | 191.4 | 106.7 | 245.8 |
| Oswego Canal | | | |
| Fulton-Dock wall | 202.5 | 11.7 | 174.7 |
| Oswego-Lake Terminal | 214.2 | ..... | 186.5 |
| Champlain Canal and Lake | | | |
| Mechanicville-Terminal | 360.1 | 193.3 | 11.4 |
| Fort Edward-Terminal | 388.7 | 222.0 | 40.1 |
| Whitehall-Terminal | 411.2 | 244.5 | 62.6 |
| Burlington-Landing | 481.8 | 315.1 | 133.1 |
| Plattsburgh-Terminal | 497.2 | 330.5 | 148.5 |
| Rouses Point-Terminal | 593.3 | 366.5 | 173.0 |

## Conversion of Compass Points to Degrees

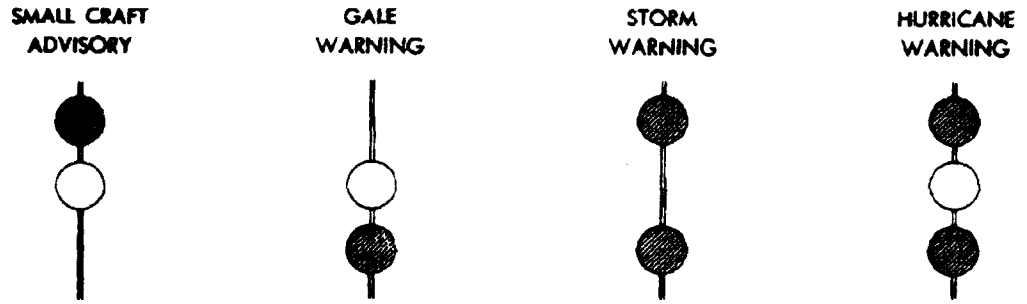
| | Points | Angular measure | | | | Points | Angular measure | | |
|---|---|---|---|---|---|---|---|---|---|
| NORTH TO EAST | | ° | ′ | | SOUTH TO WEST | | ° | ′ | |
| North | 0 | 000 | 00 | 00 | South | 16 | 180 | 00 | 00 |
| N¼E | ¼ | 002 | 48 | 45 | S¼W | 16¼ | 182 | 48 | 45 |
| N½E | ½ | 005 | 37 | 30 | S½W | 16½ | 185 | 37 | 30 |
| N¾E | ¾ | 008 | 26 | 15 | S¾W | 16¾ | 188 | 26 | 15 |
| N by E | 1 | 011 | 15 | 00 | S by W | 17 | 191 | 15 | 00 |
| N by E¼E | 1¼ | 014 | 03 | 45 | S by W¼W | 17¼ | 194 | 03 | 45 |
| N by E½E | 1½ | 016 | 52 | 30 | S by W½W | 17½ | 196 | 52 | 30 |
| N by E¾E | 1¾ | 019 | 41 | 15 | S by W¾W | 17¾ | 199 | 41 | 15 |
| NNE | 2 | 022 | 30 | 00 | SSW | 18 | 202 | 30 | 00 |
| NNE¼E | 2¼ | 025 | 18 | 45 | SSW¼W | 18¼ | 205 | 18 | 45 |
| NNE½E | 2½ | 028 | 07 | 30 | SSW½W | 18½ | 208 | 07 | 30 |
| NNE¾E | 2¾ | 030 | 56 | 15 | SSW¾W | 18¾ | 210 | 56 | 15 |
| NE by N | 3 | 033 | 45 | 00 | SW by S | 19 | 213 | 45 | 00 |
| NE¾N | 3¼ | 036 | 33 | 45 | SW¾S | 19¼ | 216 | 33 | 45 |
| NE½N | 3½ | 039 | 22 | 30 | SW½S | 19½ | 219 | 22 | 30 |
| NE¼N | 3¾ | 042 | 11 | 15 | SW¼S | 19¾ | 222 | 11 | 15 |
| NE | 4 | 045 | 00 | 00 | SW | 20 | 225 | 00 | 00 |
| NE¼E | 4¼ | 047 | 48 | 45 | SW¼W | 20¼ | 227 | 48 | 45 |
| NE½E | 4½ | 050 | 37 | 30 | SW½W | 20½ | 230 | 37 | 30 |
| NE¾E | 4¾ | 053 | 26 | 15 | SW¾W | 20¾ | 233 | 26 | 15 |
| NE by E | 5 | 056 | 15 | 00 | SW by W | 21 | 236 | 15 | 00 |
| NE by E¼E | 5¼ | 059 | 03 | 45 | SW by W¼W | 21¼ | 239 | 03 | 45 |
| NE by E½E | 5½ | 061 | 52 | 30 | SW by W½W | 21½ | 241 | 52 | 30 |
| NE by E¾E | 5¾ | 064 | 41 | 15 | SW by W¾W | 21¾ | 244 | 41 | 15 |
| ENE | 6 | 067 | 30 | 00 | WSW | 22 | 247 | 30 | 00 |
| ENE¼E | 6¼ | 070 | 18 | 45 | WSW¼W | 22¼ | 250 | 18 | 45 |
| ENE½E | 6½ | 073 | 07 | 30 | WSW½W | 22½ | 253 | 07 | 30 |
| ENE¾E | 6¾ | 075 | 56 | 15 | WSW¾W | 22¾ | 255 | 56 | 15 |
| E by N | 7 | 078 | 45 | 00 | W by S | 23 | 258 | 45 | 00 |
| E¾N | 7¼ | 081 | 33 | 45 | W¾S | 23¼ | 261 | 33 | 45 |
| E½N | 7½ | 084 | 22 | 30 | W½S | 23½ | 264 | 22 | 30 |
| E¼N | 7¾ | 087 | 11 | 15 | W¼S | 23¾ | 267 | 11 | 15 |
| EAST TO SOUTH | | | | | WEST TO NORTH | | | | |
| East | 8 | 090 | 00 | 00 | West | 24 | 270 | 00 | 00 |
| E¼S | 8¼ | 092 | 48 | 45 | W¼N | 24¼ | 272 | 48 | 45 |
| E½S | 8½ | 095 | 37 | 30 | W½N | 24½ | 275 | 37 | 30 |
| E¾S | 8¾ | 098 | 26 | 15 | W¾N | 24¾ | 278 | 26 | 15 |
| E by S | 9 | 101 | 15 | 00 | W by N | 25 | 281 | 15 | 00 |
| ESE¾E | 9¼ | 104 | 03 | 45 | WNW¾W | 25¼ | 284 | 03 | 45 |
| ESE½E | 9½ | 106 | 52 | 30 | WNW½W | 25½ | 286 | 52 | 30 |
| ESE¼E | 9¾ | 109 | 41 | 15 | WNW¼W | 25¾ | 289 | 41 | 15 |
| ESE | 10 | 112 | 30 | 00 | WNW | 26 | 292 | 30 | 00 |
| SE by E¾E | 10¼ | 115 | 18 | 45 | NW by W¾W | 26¼ | 295 | 18 | 45 |
| SE by E½E | 10½ | 118 | 07 | 30 | NW by W½W | 26½ | 298 | 07 | 30 |
| SE by E¼E | 10¾ | 120 | 56 | 15 | NW by W¼W | 26¾ | 300 | 56 | 15 |
| SE by E | 11 | 123 | 45 | 00 | NW by W | 27 | 303 | 45 | 00 |
| SE¾E | 11¼ | 126 | 33 | 45 | NW¾W | 27¼ | 306 | 33 | 45 |
| SE½E | 11½ | 129 | 22 | 30 | NW½W | 27½ | 309 | 22 | 30 |
| SE¼E | 11¾ | 132 | 11 | 15 | NW¼W | 27¾ | 312 | 11 | 15 |
| SE | 12 | 135 | 00 | 00 | NW | 28 | 315 | 00 | 00 |
| SE¼S | 12¼ | 137 | 48 | 45 | NW¼N | 28¼ | 317 | 48 | 45 |
| SE½S | 12½ | 140 | 37 | 30 | NW½N | 28½ | 320 | 37 | 30 |
| SE¾S | 12¾ | 143 | 26 | 15 | NW¾N | 28¾ | 323 | 26 | 15 |
| SE by S | 13 | 146 | 15 | 00 | NW by N | 29 | 326 | 15 | 00 |
| SSE¾E | 13¼ | 149 | 03 | 45 | NNW¾W | 29¼ | 329 | 03 | 45 |
| SSE½E | 13½ | 151 | 52 | 30 | NNW½W | 29½ | 331 | 52 | 30 |
| SSE¼E | 13¾ | 154 | 41 | 15 | NNW¼W | 29¾ | 334 | 41 | 15 |
| SSE | 14 | 157 | 30 | 00 | NNW | 30 | 337 | 30 | 00 |
| S by E¾E | 14¼ | 160 | 18 | 45 | N by W¾W | 30¼ | 340 | 18 | 45 |
| S by E½E | 14½ | 163 | 07 | 30 | N by W½W | 30½ | 343 | 07 | 30 |
| S by E¼E | 14¾ | 165 | 56 | 15 | N by W¼W | 30¾ | 345 | 56 | 15 |
| S by E | 15 | 168 | 45 | 00 | N by W | 31 | 348 | 45 | 00 |
| S¾E | 15¼ | 171 | 33 | 45 | N¾W | 31¼ | 351 | 33 | 45 |
| S½E | 15½ | 174 | 22 | 30 | N½W | 31½ | 354 | 22 | 30 |
| S¼E | 15¾ | 177 | 11 | 15 | N¼W | 31¾ | 357 | 11 | 15 |
| South | 16 | 180 | 00 | 00 | North | 32 | 360 | 00 | 00 |

# COASTAL WARNING DISPLAYS

## DAYTIME SIGNALS




## NIGHT (LIGHT) SIGNALS




EXPLANATION OF DISPLAYS

**Small Craft Advisory:** One RED pennant displayed by day and a RED light ABOVE a WHITE light at night, to alert mariners to sustained (more than two hours) weather or sea conditions, either present or forecast, that might be hazardous to small boats. Mariners learning of a Small Craft Advisory are urged to determine immediately the reason by tuning their radios to the latest marine broadcasts. Decision as to the degree of hazard will be left up to the boatman, based on his experience and size and type of boat. The threshold conditions for the Small Craft Advisory are usually 18 knots of wind (less than 18 knots in some dangerous waters) or hazardous wave conditions.

**Gale Warning:** Two RED pennants displayed by day and a WHITE light ABOVE a RED light at night to indicate that winds within the range 34 to 47 knots are forecast for the area.

**Storm Warning:** A single square RED flag with a BLACK center displayed during daytime and two RED lights at night to indicate that winds 48 knots and above, no matter how high the speed, are forecast for the area. However, if the winds are associated with a tropical cyclone (hurricane) the STORM WARNING display indicates that winds within the range 48 to 63 knots are forecast.

**Hurricane Warning:** Displayed only in connection with a tropical cyclone (hurricane). Two square RED flags with BLACK centers displayed by day and a WHITE light between two RED lights at night to indicate that winds 64 knots and above are forecast for the area.

**Note:** A "HURRICANE WATCH" is an announcement issued by the National Weather Service via press and radio and television broadcasts whenever a tropical storm or hurricane becomes a threat to a coastal area. The "Hurricane Watch" announcement is not a warning, rather it indicates that the hurricane is near enough that everyone in the area covered by the "Watch" should listen to their radios for subsequent advisories and be ready to take precautionary action in case hurricane warnings are issued.

**Note:** As of 1 February 1969 the National Weather Service discontinued its operation of the above visual system. Some local organizations, however, continued this program using information from a NOAA Weather Radio or some similar source for activating or ending their display. A SPECIAL MARINE WARNING BULLETIN is issued whenever a severe local storm or strong wind of brief duration is imminent and is not covered by existing warnings or advisories. Boaters will be able to receive these special warnings by keeping tuned to a NOAA VHF-FM radio station or to Coast Guard and commercial radio stations that transmit marine weather information.

# STANDARD ABBREVIATIONS for BROADCASTS

| *Characteristic* | *Abbrev* |
|---|---|
| Fixed | F |
| Occulting | OC |
| Group-Occulting | OC(2) |
| Composite Group-Occulting | OC(2+1) |
| Isophase | ISO |
| Single-Flashing | FL |
| Group-Flashing | FL(3) |
| Composite Group-Flashing | FL(2+1) |
| Continuous Quick-Flashing | Q |
| Interrupted Quick-Flashing | IQ |
| Morse Code | MO(A) |
| Fixed and Flashing | FFL |
| Alternating | AL |
| Characteristic | CHAR |
| *Color*[1] | |
| Black | B |
| Blue | BU |
| Green | G |
| Orange | OR |
| Red | R |
| White | W |
| Yellow | Y |
| *Aids to Navigation* | |
| Aeronautical radiobeacon | AERO RBN |
| Articulated Daybeacon | ART DBN |
| Articulated Light | ART LT |
| Destroyed | DESTR |
| Discontinued | DISCONTD |
| Established | ESTAB |
| Exposed Location Buoy | ELB |
| Fog signal station | FOG SIG |
| Large Navigation buoy | LNB |
| Light | LT |
| Light List Number | LLNR |
| Lighted Bell Buoy | LBB |
| Lighted Buoy | LB |
| Lighted Gong Buoy | LGB |
| Lighted Horn Buoy | LHB |
| Lighted Whistle Buoy | LWB |
| Ocean Data Acquisition System | ODAS |
| Privately Maintained | PRIV MAINTD |
| Radar responder beacon | RACON |
| Radar Reflector | RA REF |
| Radiobeacon | RBN |
| Temporarily Replaced by Unlighted Buoy | TRUB |
| Temporarily Replaced by Lighted Buoy | TRLB |
| Whistle | WHIS |
| *Organizations* | |
| Coast Guard | CG |
| Commander, Coast Guard District (#) | CCCD(#) |
| Corps of Engineers | COE |
| Defense Mapping Agency Hydrographic/ Topographic Center | DMAHTC |
| National Ocean Service | NOS |
| National Weather Service | NWS |
| *Vessels* | |
| Aircraft | A/C |
| Fishing Vessel | F/V |
| Liquified Natural Gas Carrier | LNG |
| Motor Vessel | M/V[2] |
| Pleasure Craft | P/C |
| Research Vessel | R/V |
| Sailing Vessel | S/V |
| *Compass Directions* | |
| East | E |
| North | N |
| Northeast | NE |
| Northwest | NW |
| South | S |
| Southeast | SE |
| Southwest | SW |
| West | W |

[1] Color refers to light characteristics of aids to navigation only.
[2] M/V includes: Steam Ship, Container Vessel, Cargo Vessel, etc.

# STANDARD ABBREVIATIONS for BROADCASTS

| | |
|---|---|
| *Months* | |
| January | JAN |
| February | FEB |
| March | MAR |
| April | APR |
| May | MAY |
| June | JUN |
| July | JUL |
| August | AUG |
| September | SEP |
| October | OCT |
| November | NOV |
| December | DEC |
| *Days of the Week* | |
| Monday | MON |
| Tuesday | TUE |
| Wednesday | WED |
| Thursday | THU |
| Friday | FRI |
| Saturday | SAT |
| Sunday | SUN |
| *Various* | |
| Anchorage | ANCH |
| Anchorage prohibited | ANCH PROHIB |
| Approximate | APPROX |
| Atlantic | ATLC |
| Authorized | AUTH |
| Average | AVG |
| Bearing | BRG |
| Breakwater | BKW |
| Broadcast Notice to Mariners | BNM |
| Channel | CHAN |
| Code of Federal Regulations | CFR |
| Continue | CONT |
| Degrees (temp; geo pos) | DEG |
| Diameter | DIA |
| Edition | ED |
| Effect/Effective | EFF |
| Entrance | ENTR |
| Explosive Anchorage | EXPLOS ANCH |
| Fathom(s) | FM(S) |
| Foot/Feet | FT |
| Harbor | HBR |
| Height | HT |
| Hertz | HZ |
| Horizontal clearance | HOR CL |
| Hour | HR |
| International Regulations for Preventing Collisions at Sea, 1972 | COLREGS |
| Kilohertz | KHZ |
| Kilometer | KM |
| Knot(s) | KT(S) |
| Latitude | LAT |
| Local Notice to Mariners | LNM |
| Longitude | LONG |
| Maintained | MAINTD |
| Maximum | MAX |
| Megahertz | MHZ |
| Millibar | MB |
| Millimeter | MM |
| Minute (time; geo pos) | MIN |
| Moderate | MOD |
| Mountain, Mount | MT |
| Nautical Mile(s) | NM |
| Notice to Mariners | NTM |
| Obstruction | OBSTR |
| Occasion/Occasionally | OCCASION |
| Operating Area | OPAREA |
| Pacific | PAC |
| Points(s) | PT(S) |
| Position | PSN |
| Position Approximate | PA |
| Pressure | PRES |
| Private, Privately | PRIV |
| Prohibited | PROHIB |
| Publication | PUB |
| Range | RGE |
| Reported | REP |
| Restricted | RESTR |
| Rock | RK |
| Saint | ST |
| Second (time; geo pos) | SEC |
| Signal station | SIG STA |
| Station | STA |
| Statute Mile(s) | SM |
| Storm signal station | S SIG STA |
| Temporary | TEMP |
| Through | THRU |
| Thunderstorm | TSTM |
| True | T |
| Uncovers; Dries | UNCOV |
| Universal Coordinate Time | UTC |
| Urgent Marine Information Broadcast | UMIB |

# STANDARD ABBREVIATIONS for BROADCASTS

*Various (cont.)*

| | |
|---|---|
| Velocity | VEL |
| Vertical clearance | VERT CL |
| Visibility | VSBY |
| Warning | WARN |
| Weather | WX |
| Wreck | WK |
| Yard(s) | YD |

*Countries and States*

| | |
|---|---|
| Alabama | AL |
| Alaska | AK |
| American Samoa | AS |
| Arizona | AZ |
| Arkansas | AD |
| California | CA |
| Canada | CN |
| Colorado | CO |
| Connecticut | CT |
| Delaware | DE |
| District of Columbia | DC |
| Federated States of Micronesia | FSM |
| Florida | FL |
| Georgia | GA |
| Guam | GU |
| Hawaii | HI |
| Idaho | ID |
| Illinois | IL |
| Indiana | IN |
| Iowa | IA |
| Kansas | KS |
| Kentucky | KY |
| Louisiana | LA |
| Maine | ME |
| Maryland | MD |
| Massachusetts | MA |
| Mexico | MX |
| Michigan | MI |
| Minnesota | MN |
| Mississippi | MS |
| Missouri | MO |
| Montana | MT |
| Nebraska | NE |
| New Hampshire | NH |
| Nevada | NV |
| New Jersey | NJ |
| New Mexico | NM |
| New York | NY |
| North Carolina | NC |
| North Dakota | ND |
| Northern Marianas | CM |
| Ohio | OH |
| Oklahoma | OK |
| Oregon | OR |
| Pennsylvania | PA |
| Puerto Rico | PR |
| Rhode Island | RI |
| South Carolina | SC |
| South Dakota | SD |
| Tennessee | TN |
| Texas | TX |
| United States | US |
| Utah | UT |
| Vermont | VT |
| Virgin Islands | VI |
| Virginia | VA |
| Washington | WA |
| West Virginia | WV |
| Wisconsin | WI |
| Wyoming | WY |

# MEASUREMENT AND CONVERSION FACTORS

## EQUIVALENCIES

| | |
|---|---|
| nautical mile | 1 852.0 meters<br>6 076.12 feet |
| statute mile | 5 280 feet<br>1 609.3 meters<br>1.6 093 kilometers |
| cable | 0.1 nautical mile (Canada)<br>720 feet (United States) |
| fathom | 6 feet<br>1.8 288 meters |
| foot | 0.3 048 meter |
| inch | 2.54 centimeters |
| meter | 39.37 inches<br>3.281 feet<br>1.0 936 yards |
| kilometer | 1 000 meters |
| knot | 1.6 877 feet per second<br>0.5 144 meters per second |
| miles (statute) per hour | 1.466 feet per second<br>0.44 704 meters per second |
| acre | 43 560 square feet<br>4 046.82 square meters |
| pound (avoirdupois) | 453.59 gram |
| gram | 0.0 022 046 pound (avoirdupois) |
| short ton | 2 000 pounds |
| long ton | 2 240 pounds |
| metric ton | 2 204.6 pounds |
| gram | 0.035 274 ounce |
| kilogram | 2.2 pounds |
| liter | 1.0 567 quarts |
| barrel (petroleum) | 42 gallons (U.S.) |

## CONVERSION FACTORS

| Symbol | When you know | Multiply by | To find | Symbol |
|---|---|---|---|---|
| **Linear** | | | | |
| in | inches | 25.40 | millimeters | mm |
| in | inches | 2.540 | centimeters | cm |
| cm | centimeters | 0.032 808 | feet | ft |
| ft | feet | 30.48 | centimeters | cm |
| ft | feet | 0.3 048 | meters | m |
| ft | feet | 0.00 016 458 | nautical miles | nm |
| yd | yards | 0.9 144 | meters | m |
| m | meters | 3.2 808 | feet | ft |
| m | meters | 1.094 | yards | yd |
| m | meters | 0.0 005 399 | nautical miles | nm |
| sm | statute miles | 0.86 897 | nautical miles | nm |
| sm | statute miles | 1.6 093 | kilometers | km |
| sm | statute miles | 1 609.3 | meters | m |
| nm | nautical miles | 1.151 | statute miles | sm |
| **Area** | | | | |
| $ft^2$ | square feet | 0.0 929 | square meters | $m^2$ |
| $m^2$ | square meters | 10.764 | square feet | $ft^2$ |
| | acres | 4 046.9 | square meters | $m^2$ |
| | acres | 43 560 | square feet | $ft^2$ |
| $m^2$ | square meters | 0.0 002 471 | acres | |
| $ft^2$ | square feet | 0.00 002 296 | acres | |
| ha | hectare | 2.471 054 | acres | |
| ha | hectare | 10 000 | square meters | $m^2$ |
| ha | hectare | $1.07\ 639 \times 10^5$ | square feet | $ft^2$ |
| | acre | 0.404 685 | hectare | ha |
| **Depths** | | | | |
| | fathoms | 1.8 288 | meters | m |
| m | meters | 0.54 681 | fathoms | |
| m | meters | 3.2 808 | feet | ft |
| ft | feet | 0.3 048 | meters | m |

## CONVERSION FACTORS

| Symbol | When you know | Multiply by | To find | Symbol |
|---|---|---|---|---|
| **Rates** | | | | |
| ft/sec | feet per second | 0.5 925 | knots | kt |
| ft/sec | feet per second | 0.6 818 | miles per hour | mph |
| ft/sec | feet per second | 30.48 | centimeters per second | cm/s |
| mph | statute miles per hour | 0.8 689 | knots | kt |
| mph | statute miles per hour | 1.467 | feet per second | fps |
| mph | statute miles per hour | 0.447 | meters per second | m/s |
| kt | knots | 1.151 | miles per hour | mph |
| kt | knots | 0.5 144 | meters per second | m/s |
| kt | knots | 1.6 878 | feet per second | fps |
| cm/sec | centimeters per second | 0.01 944 | knots | kt |
| cm/sec | centimeters per second | 0.02 237 | miles per hour | mph |
| cm/sec | centimeters per second | 0.032 808 | feet per second | fps |
| **Mass** | | | | |
| g | grams | 0.035 275 | ounces (avoirdupois) | oz |
| g | grams | 0.002 205 | pounds (avoirdupois) | lb |
| oz | ounces (avoirdupois) | 28.349 | grams | g |
| lb | pounds | 0.45 359 | kilograms | kg |
| | short tons | 2 000 | pounds | lb |
| | short tons | 0.89 286 | long tons | |
| | short tons | 0.9 072 | metric tons | t |
| | long tons | 2 240 | pounds | lb |
| | long tons | 1.12 | short tons | |
| | long tons | 1.016 | metric tons | t |
| t | metric tons | 1 000 | kilograms | kg |
| t | metric tons | 0.9 842 | long tons | |
| t | metric tons | 1.1 023 | short tons | |
| t | metric tons | 2 204.6 | pounds | lb |
| **Volume** | | | | |
| | barrels (petroleum) | 42 | gallons (U.S.) | gal |
| | barrels (petroleum) | 158.99 | liters | L |
| | barrels (liquid, U.S.) | 31.5 | gallons (U.S.) | gal |
| | barrels (liquid, U.S.) | 26.229 | gallons (British) | gal |
| | barrels (liquid, U.S.) | 119.24 | liters | L |
| gal | gallons (U.S.) | 0.02 381 | barrels (petroleum) | |
| L | liters | 0.26 417 | gallons (U.S.) | gal |
| gal | gallons (U.S.) | 3.7 854 | liters | L |
| **Temperature** | | | | |
| | Degrees Fahrenheit | 5/9 after subtracting 32) | Degrees Celsius | |
| | Degrees Celsius | 9/5 (then add 32) | Degrees Fahrenheit | |

# METRIC STYLE GUIDE

**Prefixes:** Some of the metric units listed include prefixes such as kilo, centi, and milli. Prefixes, added to a unit name, create larger or smaller units by factors that are powers of 10. For example, add the prefix kilo, which means a thousand, to the unit gram to indicate 1000 grams; thus 1000 grams become 1 kilogram. The more common prefixes follow.

| Factor | | Prefix | Symbol |
|---|---|---|---|
| 1 000 000 | $10^6$ | mega | M |
| 1 000 | $10^3$ | kilo | k |
| 1/100 | $10^{-2}$ | centi | c |
| 1/1000 | $10^{-3}$ | milli | m |
| 1/1 000 000 | $10^{-6}$ | micro | $\mu$ |

**Spelling:** All units and prefixes should be spelled as shown in this guide.

**Conversions:** Conversions should follow a rule of reason; do not include figures that imply more accuracy than justified by the original data. For example, 36 inches should be converted to 91 centimeters, not 91.44 centimeters (36 inches x 2.54 centimeters per inch = 91.44 centimeters), and 40.1 inches converts to 101.9 centimeters, not 101.854.

**Capitalization of Units:** The names of all units start with a lower case letter except, of course, at the beginning of the sentence. There is one exception: in "degree Celsius" (symbol °C) the unit "degree" is lower case but the modifier "Celsius" is capitalized. Thus body temperature is written as 37 degrees Celsius.

**Capitalization of Symbols:** Unit symbols are written in lower case letters except for liter and those units derived from the name of a person (m for meter, but W for Watt, Pa for pascal, etc.).

**Capitalization of Prefixes:** Symbols of prefixes that mean a million or more are capitalized and those less than a million are lower case (M for mega (millions), m for milli (thousandths)).

**Pluralization of Units:** Names of units are made plural only when the numerical value that precedes them is more than 1. For example, 0.25 liter or 1/4 liter, but 250 milliliters. Zero degrees Celsius is an exception to this rule.

**Symbols:** Symbols for units are never pluralized (250 mm = 250 millimeters).

**Incorrect Terms:** The prefix "kilo" stands for one thousand of the named unit. It is not a stand-alone term in the metric system. The most common misuse of this is the use of "kilo" for a "kilogram" of something. The word "micron" is an obsolete term for the quantity "micrometer." Also "degree centigrade" is no longer the correct unit term for temperature in the metric system; it has been replaced by degree Celsius.

## METRIC STYLE GUIDE (cont.)

**Spacing:** A space is used between the number and the symbol to which it refers. For example: 7 m, 31.4 kg, 37° C.

When a metric value is used as a one-thought modifier before a noun, hyphenating the quantity is not necessary. However, if a hyphen is used, write out the name of the metric quantity with the hyphen between the numeral and the quantity. For example:

a 2-liter bottle, NOT a 2-L bottle;
a 100-meter relay, NOT a 100-m relay;
35-milimeter film, NOT 35-mm film.

In names or symbols for units having prefixes, there is not space between letters making up the symbol or name. Examples; milligram, mg; kilometer, km.

Spaces (not commas) are used in writing metric values containing five or more digits. Examples 1 234 567 km, 0.123 456 mm. For values with four digits, either a space or no space is acceptable.

**Period:** DO NOT use a period with metric unit names and symbols except at the end of a sentence.

**Decimal Point:** The dot or period is used as the decimal point within numbers. In numbers less than one, zero should be written before the decimal point. Examples: 7.038 g; 0.038 g.

# Index

The numbers of the largest scale charts on which the names appear follow the indexed items. Some geographic names are indexed more than once when more than one place has the same geographic name. Charts published by the Canadian Hydrographic Service are indicated by an asterisk.


| | Page |
|---|---|
| Abbreviations for Broadcast | 13 |
| Academy, Great Lakes Maritime 14913 | 247 |
| Acadia Rock 14967, 14968 | 366 |
| Acceptable Vessel Watering Points | 6 |
| Adams Point 14864, 14880 | 232 |
| Advance, Mich. 14942 | 246 |
| Agate Bay 14966 | 363 |
| Agate Harbor 14964 | 350 |
| Agriculture, Department of | 6, 380 |
| Ahnapee River 14910 | 312 |
| Aids to navigation | 21 |
| Air Almanac | 376 |
| Aircraft procedures for directing surface craft to scene of distress incident | 10 |
| Alabaster, Mich. 14863 | 227 |
| Alanson, Mich. 14886 | 235 |
| Alaska Bay 14863 | 221 |
| Alburg Passage 14781 | 373 |
| Alburg Tongue 14781 | 373 |
| Alexandria Bay, N.Y. 14772 | 123 |
| Algoma, Wis. 14910 | 312 |
| Algonac, Mich. 14852, 14853 | 213 |
| Allan Otty Shoal 14802 | 128 |
| Allanburg 14822, *2042 | 143 |
| Allouez Bay 14975 | 355 |
| Alpena Harbor 14864 | 230 |
| Alpena, Mich. 14864 | 230 |
| Alverno Dam 14886 | 234 |
| Ambassador Bridge 14853, 14848 | 200 |
| American Eagle Shoal 14844, 14842 | 190 |
| American Falls 14816 | 139 |
| American Falls 14832 | 147 |
| American Narrows 14766 | 123 |
| American Practical Navigator (Bowditch) | 376 |
| Amherstburg Channel 14853, 14848 | 194 |
| Amherstburg, Ont. 14853, 14848 | 195 |
| AMVER Reporting | 3 |
| Amygdaloid Channel 14976 | 367 |
| Amygdaloid Island 14976 | 367 |
| Anchor Bay 14850 | 205 |
| Anchorage Regulations | 36 |
| Animal and Plant Health Inspection Service | 6, 380 |
| Animal Import Centers | 380 |
| Anna River 14969 | 345 |
| Ansels Point 14908 | 327 |
| Apostle Islands 14973 | 353 |
| Apostle Islands National Lakeshore 14973 | 353 |
| Arcadia Lake 14907 | 252 |
| Arcadia, Mich. 14907 | 252 |
| Arthur Bay 14909 | 325 |
| Articulated daybeacons | 22 |
| Articulated lights | 22 |
| Ash Island 14772 | 122 |
| Ashland Harbor 14974 | 352 |
| Ashland, Wis. 14974 | 352 |
| Ashtabula Harbor 14836 | 164 |
| Ashtabula River 14836 | 164 |
| Astronomical Almanac | 376 |
| Au Gres River 14863 | 227 |
| Au Gres, Mich. 14863 | 227 |
| Au Sable Harbor 14863 | 228 |
| Au Sable Point 14863 | 222, 228 |
| Au Sable Point 14962, 14963 | 345 |
| Au Sable River 14863 | 228 |
| Au Sable, Mich. 14863 | 228 |
| Au Train Bay 14963 | 345 |
| Au Train Island 14963 | 345 |
| Au Train Point 14969 | 345 |
| Automated Mutual-assistance Vessel Rescue System (AMVER) | 3 |
| Avon Point 14826 | 176 |
| Baby Point 14852 | 210 |
| Bad River | 225 |
| Baileys Harbor 14909 | 314 |
| Baird Point 14802 | 128 |
| Ballards Reef Channel 14853, 14848 | 196 |
| Ballards Reef Channel Light 77D 14853, 14848, 14849 | 195 |
| Ballast Island 14844, 14842 | 191 |
| Ballast Water Management | 108 |
| Baptism River 14967 | 364 |
| Baptiste Creek 14850 | 208 |
| Bar Point 14830 | 191 |
| Baraga, Mich. 14971 | 348 |
| Barbed Point 14882 | 238, 330, 332 |
| Barber Point 14783 | 372 |
| Barcelona Harbor 14823 | 161 |
| Bare Point 14864 | 229 |
| Bark Bay 14966 | 355 |
| Bark Point 14966 | 355 |
| Barnhart Island 14761 | 118 |
| Bartlett Point 14774 | 125 |
| Bass Island 14811 | 129 |
| Bass Lake 14907 | 254 |
| Basswood Island 14973 | 353 |
| Battery Point 14823 | 160 |
| Bay City, Mich. 14867 | 223 |
| Bay Furnace 14969 | 345 |
| Bay Point 14852, 14853 | 215 |
| Bay Point Shoal 14844 | 181 |
| Bay Port Harbor, Mich. 14863 | 223 |
| Bay State Shoal 14771 | 121 |
| Bayfield Channel 14884 | 333 |
| Bayfield Dike 14884 | 333 |
| Bayfield Island 14767 | 125 |
| Bayfield, Wis. 14973 | 353 |
| Bear Island 14967 | 364 |
| Bear Island 14973 | 354 |
| Bear Island Shoal 14973 | 354 |
| Bear Lake 14934 | 256 |
| Bear Point 14768 | 125 |
| Bearings | 1 |
| Beaver Bay 14966, 14967 | 364 |
| Beaver Creek 14826 | 178 |
| Beaver Island 14911 | 249 |
| Beaver Island 14967 | 364 |
| Beaver Island 14976 | 366 |
| Beaver Tail Point 14882 | 238 |
| Beaver Tail Reef 14882 | 238 |
| Bellaire Lake 14913 | 247 |
| Belle Isle 14976 | 367 |
| Belle Isle, MI 14853, 14848 | 200 |
| Belle River 14850 | 208 |
| Belle River 14852, 14853 | 213 |
| Bellevue Island 14882 | 238 |
| Bellow Island 14913 | 248 |
| Belmont Harbor 14926, 14928 | 293 |
| Benson Landing 14784 | 371 |
| Benton Harbor, Mich. 14930 | 266 |
| Berlin, Wis. | 323 |
| Bete Grise Bay 14964 | 350 |

| | Page |
|---|---|
| Betsie Lake 14907 | 251 |
| Betsie River 14907 | 251 |
| Biddle Point 14881 | 236 |
| Biddle Point 14911 | 329 |
| Big Bay 14932 | 260 |
| Big Bay 14963, 14964 | 347 |
| Big Bay 14967 | 365 |
| Big Bay 14973 | 353 |
| Big Bay de Noc 14908 | 327 |
| Big Bay de Noc Shoal 14908 | 327 |
| Big Bay Harbor 14963 | 347 |
| Big Bay Point 14963, 14964 | 347 |
| Big Chicken Island 14844 | 191 |
| Big Iron River 14965 | 351 |
| Big Manistee River 14938 | 252 |
| Big Point 14884 | 339 |
| Big Rock Point 14913 | 245 |
| Big Sable Point 14907 | 253 |
| Big Sable River 14907 | 253 |
| Big Sandy Bay 14768 | 125 |
| Big Shoal 14882 | 239 |
| Big Shoal Cove 14882 | 239 |
| Big Sister Creek 14823 | 160 |
| Big St. Martin Island 14881 | 237 |
| Big Stone Bay 14881 | 245 |
| Birch Island 14976 | 367 |
| Birch Point 14884 | 339 |
| Bird Creek 14863 | 222 |
| Bird Island 14833, 14832 | 149 |
| Bird Island Pier 14832 | 147 |
| Black Creek 14853 | 205 |
| Black Lake | 234 |
| Black Point 14864, 14880 | 232 |
| Black River 14811 | 129 |
| Black River 14841 | 177 |
| Black River 14852, 14853 | 215 |
| Black River 14864 | 229 |
| Black River 14886 | 234 |
| Black River 14906 | 264 |
| Black River 14965 | 351 |
| Black River Bay 14811 | 129 |
| Black River Canal 14865 | 220 |
| Black River Harbor 14965 | 351 |
| Black River Island 14864 | 229 |
| Black Rock Canal 14832 | 147 |
| Black Rock Lock 14833, 14832 | 149 |
| Black Rock Point 14882 | 238, 330, 332 |
| Blake Point 14976 | 367 |
| Blind Bay 14771 | 122 |
| Blind Sodus Bay 14803 | 132 |
| Blockhouse Island 14770 | 121 |
| Blue Water Bridge 14852, 14853 | 215 |
| Boardman Lake 14913 | 247 |
| Boardman River 14913 | 247 |
| Bogus Point 14805 | 136 |
| Bois Blanc Island 14881 | 233 |
| Bois Blanc Island, Ont. 14853, 14848 | 195 |
| Bois Blanc Light 14881 | 236 |
| Bolles Harbor, Mich. 14830, 14846 | 189 |
| Booth Island 14976 | 366 |
| Boquet (Bouquet) River 14783 | 372 |
| Boulder Reef 14911 | 250 |
| Boundary Island 14967, 14968 | 366 |
| Bowers Harbor 14913 | 247 |
| Boyne City, MI 14942 | 246 |
| Braddock Bay 14805 | 136 |
| Braddock Point 14805 | 136 |
| Braddock Point Light 14805 | 136 |
| Bradford Island 14762 | 118 |
| Brest Bay 14830, 14846 | 189 |
| Bridge and cable clearances | 19 |
| Bridge lights and clearance gages | 22 |
| Bridges | 1 |
| Bridge-to-Bridge Radiotelephone Communication | 28 |
| Broadcast Abbreviations | 13 |
| Broadway Shoal 14772 | 123 |
| Brockville Narrows 14770 | 121 |
| Brockville, Ont. 14770 | 121 |
| Broder Island 14762 | 118 |
| Brothertown Harbor 14916 | 323 |
| Brown Bay 14773 | 123 |
| Brulee Point 14881 | 237 |
| Brush Point 14884 | 330 |
| Brush Point, MI, 14884 | 339 |
| Buckhorn Island 14832 | 151 |
| Buffalo Bay 14973 | 353 |
| Buffalo Harbor 14833 | 151 |
| Buffalo River 14833 | 151, 154 |
| Buffalo Ship Canal 14833 | 154 |
| Buffalo, N.Y. 14833 | 151 |
| Buffington Harbor 14929 | 272 |
| Bulwagga Bay 14784 | 372 |
| Buoys | 22 |
| Burlington Bay 14966 | 364 |
| Burlington, Vt. 14785 | 373 |
| Burnham Canal 14924 | 299 |
| Burnham Park Harbor 14927, 14926 | 279 |
| Burns International Harbor 14905 | 270 |
| Burnt Bluff 14908 | 328 |
| Burnt Cabin Point 14863 | 221 |
| Burt Lake 14886 | 235 |
| Burtch Creek 14862 | 220 |
| Burton Island 14781 | 373 |
| C Line Dock 14883 | 332 |
| Cable clearances | 19 |
| Cable ferries | 1 |
| Cables | 1 |
| Calcite, Mich. 14864 | 232 |
| Calf Island 14802 | 130 |
| Calumet (South Chicago) Harbor 14929 | 274 |
| Calumet Bar 14929 | 275 |
| Calumet Harbor 14916 | 323 |
| Calumet Island 14774 | 123 |
| Calumet River 14929 | 274 |
| Calumet River Branch 14929 | 272 |
| Calumet Sag Channel 14927 | 286 |
| Calumet Shoal 14774 | 125 |
| Camp Perry 14830 | 183 |
| Campbell Point 14811 | 129 |
| Cana Island Light 14909 | 314 |
| Canada Island 14762 | 119 |
| Canada Ports Corporation Lower Lakes Terminal 14763 | 119 |
| Canadian Coast Guard | 31 |
| Canadian Customs Offices | 381 |
| Canadian Government Agencies | 381 |
| Canadian Hydrographic Service | 31 |
| Canadian source | 31 |
| Canal Basin 14835 | 163 |
| Canal de Chambly *1351 | 374 |
| Canal System, New York State 14786 | 130 |
| Canal System, New York State Barge 14786 | 369 |
| Canal System, New York State Barge 14832 | 150 |
| Canal, Black River 14865 | 220 |
| Canal, Black Rock 14832 | 147 |
| Canal, Buffalo Ship 14833 | 154 |
| Canal, Burnham 14924 | 299 |
| Canal, Cayuga and Seneca 14786, 14791 | 369 |
| Canal, Champlain 14786 | 369 |
| Canal, Chicago Sanitary and Ship 14928 | 286 |
| Canal, Cutoff 14850 | 205 |
| Canal, Erie 14786 | 369 |
| Canal, Indiana Harbor 14929 | 272 |
| Canal, Lackawanna 14833 | 154 |
| Canal, Massena 14761 | 118 |
| Canal, North 14884 | 337 |
| Canal, Old Galop 14763 | 119 |
| Canal, Oswego 14786 | 132, 369 |
| Canal, Sault Ste. Marie (Canada) 14884 | 338 |
| Canal, Short Cut 14854 | 198 |

| | Page |
|---|---|
| Canal, South 14884 | 337 |
| Canal, South Menomonee 14924 | 299 |
| Canal, St. Clair Flats 14852, 14853 | 213 |
| Canal, St. Marys Falls 14884 | 333 |
| Canal, Sturgeon Bay Ship 14919 | 313 |
| Canal, Torch Lake 14972 | 349 |
| Canal, Union 14833 | 154 |
| Canal, Welland *2042, 14822 | 139 |
| Canal, Wiley-Dondero 14761 | 118 |
| Canoe Rocks 14976 | 367 |
| Cape Vincent, N.Y. 14767, 14768 | 125 |
| Caribou Island 14976 | 367 |
| Carleton Island 14767 | 125 |
| Carlton Peak 14967 | 365 |
| Carp River Point 14912 | 250 |
| Carpenter Point 14768 | 125 |
| Carpenter Point 14844, 14842 | 190 |
| Carrollton, Mich. 14867 | 223 |
| Cascade River 14967 | 365 |
| Caseville Harbor, Mich. 14863 | 222 |
| Cass River | 225 |
| Cat Island 14762 | 118 |
| Cat Island 14918 | 318 |
| Cat Island 14973 | 354 |
| Cat Island Shoal 14762 | 118 |
| Catamaran Shoal 14764 | 121 |
| Cataraqui River *2017, 14768 | 123 |
| Catawba Island 14844, 14842 | 182 |
| Cathead Bay 14913 | 250 |
| Cathead Point 14913 | 250 |
| Cattaraugus Creek 14823 | 160 |
| Cave Point 14910 | 314 |
| Cayuga and Seneca Canal 14786, 14791 | 369 |
| Cayuga Creek 14832 | 150 |
| Cayuga Island 14832 | 150 |
| Cayuga Lake 14791 | 369 |
| Cazenovia Creek 14833 | 154 |
| Cecil Bay 14881 | 245 |
| Cedar Island 14771 | 122 |
| Cedar Point 14830, 14846 | 183 |
| Cedar Point 14845, 14830 | 180 |
| Cedar River 14909 | 325 |
| Cedar River, Mich. 14909 | 325 |
| Cedarville, Mich. 14885 | 238 |
| Celeron Island 14848, 14853 | 196 |
| Central Standard Time | 268 |
| Chagrin River 14825, 14829 | 169 |
| Chambers Island 14909 | 317 |
| Champlain Canal 14786 | 369 |
| Channel markers, caution | 22 |
| Chapman Shoal 14774 | 123 |
| Charity Island 14863 | 222 |
| Charity Shoal 14802 | 128 |
| Charles Point 14814 | 133 |
| Charlevoix, Mich. 14942 | 245 |
| Chart Datum, Detroit River | 192 |
| Chart Datum, Great Lakes System | 16 |
| Chart Datum, Hudson River | 369 |
| Chart Datum, Inland Route | 234 |
| Chart Datum, Lake Champlain | 371 |
| Chart Datum, Lake Erie | 145 |
| Chart Datum, Lake Huron | 218 |
| Chart Datum, Lake Michigan | 240 |
| Chart Datum, Lake Ontario | 126 |
| Chart Datum, Lake St. Clair | 204 |
| Chart Datum, Lake Superior | 341 |
| Chart Datum, Lake Winnebago | 322 |
| Chart Datum, New York State Canal | 369 |
| Chart Datum, St. Clair River | 210 |
| Chart Datum, St. Lawrence River above Iroquois Dam | 119 |
| Chart Datum, St. Lawrence River, above Summerstown and below Snell Lock | 117 |
| Chart Datum, St. Lawrence River, Eisenhower Lock to Iroquois Lock | 118 |
| Chart Datum, St. Mary's River | 330 |
| Chart Datum, Upper Niagara River | 147 |
| Chart Numbering System | 19 |
| Chart symbols and abbreviations | 15 |
| Charts and Publications-National Ocean Service | 375 |
| Charts and Publications-Other U.S. Government Agencies | 375 |
| Chassell, Mich. 14972 | 348 |
| Chaumont Bay 14811, 14802 | 128 |
| Chaumont River 14811 | 129 |
| Chaumont, N.Y. 14811 | 129 |
| Chautaugua Creek 14823 | 161 |
| Cheboygan Harbor 14881, 14886 | 233 |
| Cheboygan Point 14881 | 233 |
| Cheboygan River 14881, 14886 | 233, 234 |
| Cheboygan River Lock 14886 | 234 |
| Cheboygan, Mich. 14881, 14886 | 233 |
| Chenal A Bout Rond 14852, 14853 | 213 |
| Chenal Ecarte 14850, 14852 | 207 |
| Chenal Ecarte 14852, 14850 | 210 |
| Chequamegon Bay 14973 | 352 |
| Chequamegon Point 14973 | 352 |
| Cherry Island 14772 | 123 |
| Cherry Island 14811 | 129 |
| Chicago Bay 14967 | 365 |
| Chicago City Datum | 282 |
| Chicago Harbor 14928 | 279 |
| Chicago Lock 14928 | 282 |
| Chicago River 14928 | 279 |
| Chicago Sanitary and Ship Canal 14928 | 286 |
| Chicago, Ill. 14927 | 274, 279 |
| Chick Island 14844 | 191 |
| Chimney Island 14763 | 119 |
| Chimney Point 14763 | 119 |
| Chipman Point 14784 | 371 |
| Chippawa Channel 14832 | 147, 149 |
| Chippawa, Ont. 14832 | 151 |
| Chippewa Bay 14771 | 122 |
| Chippewa Bay, N.Y. 14771 | 122 |
| Chippewa Harbor 14976 | 367 |
| Chippewa Point 14771 | 122 |
| Chippewa Point 14882 | 238 |
| Chippewa Point 14908 | 327 |
| Chocolay River 14963 | 346 |
| City Bay 14781 | 373 |
| Clam Lake 14913 | 247 |
| Clark Bay 14967, 14968 | 366 |
| Clark Island Shoal 14762 | 119 |
| Clark Point Shoal 14927, 14926 | 279 |
| Clayton, N.Y. 14774 | 123 |
| Clemson Shoal 14927 | 279 |
| Cleveland Harbor 14839 | 169 |
| Cleveland, Ohio 14839 | 169 |
| Cleveland, Wis. 14903 | 309 |
| Clinton River 14853 | 205 |
| Clough Island 14975 | 355 |
| Clyde River 14786 | 369 |
| Coast Guard | 3 |
| Coast Guard District Offices | 376 |
| Coast Guard Documentation Offices | 377 |
| Coast Guard droppable, floatable pumps | 12 |
| Coast Guard Marine Safety Detachment Offices | 377 |
| Coast Guard Marine Safety Offices | 377 |
| Coast Guard Radio Broadcasts | 378 |
| Coast Guard radio stations | 12 |
| Coast Guard Stations | 377 |
| Coast Guard vessels, warning signals | 26 |
| Coast Pilot | 1, 375 |
| COCO | 25 |
| Cole Ferry Shoal 14770 | 121 |
| Cole Shoal 14770 | 121 |
| Compass roses on charts | 20 |
| Conglomerate Bay 14976 | 367 |
| Conneaut Harbor 14824, 14828 | 164 |
| Conneaut River 14824, 14828 | 164 |
| Conneaut, Ohio 14824, 14828 | 164 |
| Connors Point 14975 | 355 |
| Control of shipping in time of emergency or war | 27 |

| | Page |
|---|---|
| Conway Point 14964 | 347 |
| Conway, Mich. 14886 | 236 |
| Cooley Creek 14830, 14846 | 183 |
| Copper Harbor 14964 | 350 |
| Copper Harbor, Mich. 14964 | 350 |
| Cordwood Point 14881 | 233 |
| Cornucopia, Wis. 14966 | 354 |
| Cornwall Island 14761 | 117 |
| Cornwall, Ont. 14761 | 117 |
| Corona Shoal 14908 | 327 |
| Corundum Point 14966 | 364 |
| Corunna, Ont. 14852, 14853 | 215 |
| COSPAS-SARSAT system | 8 |
| Courses | 1 |
| Courtright, Ont. 14852, 14853 | 214 |
| Crab Island 14882 | 238 |
| Crab Island Shoal 14882 | 238, 331 |
| Cranberry River 14966 | 355 |
| Cranberry Shoal 14911 | 328 |
| Crisp Point 14962 | 344 |
| Croil Islands 14761, 14762 | 118 |
| Crooked Lake 14886 | 236 |
| Crooked River 14886 | 235 |
| Crooked River Lock 14886 | 235 |
| Cross Village, Mich. 14911 | 245 |
| Crossover Island 14771 | 121 |
| Crow Island 14885 | 238 |
| Crown Point 14784 | 371 |
| Cruising schedules | 12 |
| Crysler Shoal 14762 | 118 |
| Cumberland Bay 14782 | 373 |
| Cumberland Head 14782 | 373 |
| Cumberland Point 14976 | 366 |
| Currents | 1 |
| Currents, Detroit River | 192 |
| Currents, St. Clair River | 210 |
| Currents, St. Lawrence River | 117, 119 |
| Currents, Wiley-Dondero Canal | 118 |
| Customs Ports of Entry and Stations | 378 |
| Customs Service | 5 |
| Cutoff Canal 14850 | 205 |
| Cuttysark Harbor 14913 | 247 |
| Cuyahoga River 14839 | 169 |
| Dablon Point 14802 | 128 |
| Dahlia Shoal 14911 | 249 |
| Dam, Iroquois 14763 | 119 |
| Dam, Long Sault Spillway 14761 | 118 |
| Dam, Moses-Saunders Power 14761 | 118 |
| Danger signal | 27 |
| Danger zones | 109 |
| Dates of Latest Editions | 17 |
| Datum, Chicago City | 282 |
| Datum, Horizontal | 16 |
| Davis Lock 14884 | 337 |
| Daylight saving time | 113 |
| De Pere, Wis. 14916, 14918 | 317 |
| De Tour Passage 14882 | 330, 331 |
| De Tour Reef 14882 | 238, 331 |
| De Tour Shoal 14882 | 331 |
| De Tour Village, Mich. 14882 | 332 |
| Dead Creek 14781 | 373 |
| Dead Horse Bay 14918 | 324 |
| Deadmans Point 14909 | 326 |
| Deathdoor Bluff 14909 | 316 |
| Deaths Door 14909 | 315 |
| Deck officers | 27 |
| Deepwater Point 14913 | 247 |
| Deer Creek 14909 | 326 |
| Deer Island 14772 | 123 |
| Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) Offices | 380 |
| Depths | 1 |
| Des Plaines River | 286 |
| Detroit Harbor 14909 | 315 |
| Detroit Island 14909 | 315 |
| Detroit Island Passage 14909 | 315 |
| Detroit River 14848, 14849, 14853 | 192, 194 |
| Detroit River Light 14848 | 190, 194 |
| Detroit, Mich. 14853, 14848 | 201 |
| Devils Island 14973 | 354 |
| Devils Island Shoal 14973 | 354 |
| Devils Nose 14805 | 136 |
| Devils River 14864 | 229 |
| DGPS | 24 |
| Dickinson Island 14852, 14853 | 213 |
| Differential GPS (DGPS) | 24 |
| Dimmicks Point 14912 | 251 |
| Disposal areas | 20 |
| Disposal Sites | 20, 108 |
| Distances | 2 |
| Distress Assistance and Coordination Procedures | 10 |
| Distress Signals and Communication Procedures | 6 |
| Diversey Harbor 14926, 14928 | 293 |
| Dix Point 14882 | 238 |
| Documentation | 4 |
| Dollar Bay 14972 | 349 |
| Dollar Bay, Mich. 14972 | 349 |
| Donner Point 14912 | 251 |
| Door Peninsula 14902 | 315 |
| Doran Shoal 14762 | 118 |
| Doty Island 14916 | 322 |
| Douglas, Mich. 14906 | 263 |
| Drawbridge Operation Regulations | 40 |
| Drawbridges | 109 |
| Drisco Shoal 14908, 14909 | 327 |
| Drowned Island 14802 | 130 |
| Drummond Island 14763 | 119 |
| Drummond Island 14880 | 238 |
| Drummond Island, MI 14882 | 330 |
| Drummond, MI 14882 | 238 |
| Duck Creek 14918 | 324 |
| Dugway Brook 14826 | 169 |
| Duluth Entry 14975 | 355 |
| Duluth, Minn. 14975 | 355 |
| Duluth-Superior Harbor 14975 | 355 |
| Dumping Grounds | 20, 108 |
| Dumping of dredged material | 5 |
| Duncan Bay 14881 | 233 |
| Duncan Bay 14976 | 367 |
| Dunkirk Harbor 14823 | 160 |
| Dunkirk, N.Y. 14823 | 160 |
| Dunlap Reef 14919 | 313 |
| Dutch John Bay 14802 | 130 |
| Dutch Johns Point 14908 | 328 |
| Dutchman Point 14915 | 327 |
| Eagle Bluff 14909 | 317 |
| Eagle Bluff Light 14909 | 317 |
| Eagle Harbor 14909 | 317 |
| Eagle Harbor 14964 | 350 |
| Eagle Island 14814 | 133 |
| Eagle Island 14973 | 354 |
| Eagle Island Shoals 14973 | 354 |
| Eagle River Shoals 14964 | 351 |
| Eagle River, Mich. 14964 | 351 |
| East Arm 14913 | 246 |
| East Bay 14804 | 133 |
| East Bay 14973 | 354 |
| East Branch Twelvemile Creek 14810, 14806 | 137 |
| East Charity Shoal 14802 | 128 |
| East Chicago, Ind. 14929 | 272 |
| East Harbor 14844, 14842 | 182 |
| East Jordan 14942 | 246 |
| East Moran Bay 14881 | 237 |
| East Outer Channel 14848 | 194 |
| East River 14916, 14918 | 318 |
| East Shoal 14911 | 248 |
| East Sister Island 14844 | 191 |
| East Sister Shoal 14844 | 191 |

| | Page |
|---|---|
| East Tawas, Mich. 14863 | 228 |
| East Twin River 14903 | 311 |
| Echo soundings | 20 |
| Ecorse Channel, 14854 | 196 |
| Ecorse River 14854 | 196 |
| Ecorse, Mich. 14854 | 196 |
| Egg Harbor 14909 | 317 |
| Egg Harbor, Wis. 14909 | 317 |
| Eighteenmile Creek 14810, 14806 | 137 |
| Eisenhower Lock 14761 | 118 |
| Eleven Foot Shoal 14908 | 327 |
| Elk Lake 14913 | 247 |
| Elk Rapids, Mich. 14913 | 246 |
| Elk River 14913 | 246 |
| Ellison Bay 14909 | 316 |
| Ellison Bay, Wis. 14909 | 316 |
| Ellison Bluff 14909 | 316 |
| Emergency Numbers, USACE | 286 |
| Empire Bluffs 14912 | 251 |
| Empire Shoal 14771 | 122 |
| Empire, Mich. 14912 | 251 |
| Encampment Island 14966 | 364 |
| Environmental Protection Agency (EPA) | 5 |
| Environmental Protection Agency (EPA) Offices | 376 |
| Ephraim, Wis. 14909 | 317 |
| EPIRBs | 8 |
| Erie Canal 14786 | 369 |
| Erie Harbor 14835 | 161 |
| Erie, Pa. 14835 | 161 |
| Erma Henderson Park 14853 | 201 |
| Escanaba River 14915 | 326 |
| Escanaba, Mich. 14915 | 326 |
| Espanore Island 14882 | 239 |
| Essex, N.Y. 14783 | 372 |
| Essexville, Mich. 14867 | 223 |
| Euclid Creek 14826 | 169 |
| Eureka, Wis. | 323 |
| Everleigh Point 14811 | 129 |
| Excelsior Group 14772 | 123 |
| Extratropical Cyclones | 110 |
| | |
| Fagan Reef 14911 | 248 |
| Fair Haven, Mich. 14853 | 206 |
| Fairbanks Point 14804 | 133 |
| Fairport Harbor 14837 | 167 |
| Fairport, Mich. 14908 | 328 |
| Falls River 14971 | 348 |
| False Detour Channel 14880, *2251 | 239 |
| False Presque Isle 14869 | 231 |
| False Presque Isle Harbor 14869 | 231 |
| Fawn Island, Ont. 14852, 14853 | 213 |
| Fayette, Mich. 14908 | 327 |
| Feather Bed Shoal 14767, 14768 | 125 |
| Federal Communications Commission | 5 |
| Federal Communications Commission Offices | 380 |
| Federal Requirements for Recreational Boats | 376 |
| Ferrysburg, Mich. 14933 | 258 |
| Fifty-ninth (59th) Street Harbor 14926 | 279 |
| Figenscaus Harbor (West Harbor) 14909 | 315 |
| Fighting Island Channel 14853, 14848 | 196 |
| Fighting Island, Ont. 14853, 14848 | 196 |
| Fineview, N.Y. 14773 | 123 |
| Finlander Reef 14976 | 366 |
| Fish Creek Harbor 14909 | 317 |
| Fish Creek, Wis. 14909 | 317 |
| Fish havens | 4, 20 |
| Fish Island 14909 | 316 |
| Fish Point 14863 | 223 |
| Fisherman Island 14913 | 246 |
| Fisherman Reef 14968 | 366 |
| Fisherman Shoal 14909 | 316 |
| Fishermans Bay 14964 | 350 |
| Fishermans Home 14976 | 368 |
| Fishers Landing, N.Y. 14773 | 123 |
| Fishery Conservation Zone | 27 |
| Fishery Point 14908 | 326 |
| Fishtrap areas | 20 |
| Fishtraps | 4 |
| Five Finger Bay 14976 | 367 |
| Five Foot Reef 14976 | 367 |
| Five Mile Point 14964 | 351 |
| Five Mile Rock 14967 | 365 |
| Fivemile Point 14969 | 345 |
| Flag River 14966 | 355 |
| Flat Rock Point 14863 | 222 |
| Flat Rock Point Reef 14863 | 222 |
| Fleming Channel 14853, 14848 | 200 |
| Flint River | 225 |
| Fluctuations of water level | 109 |
| Fog | 110 |
| Fog signal characteristics | 2 |
| Fog signals | 22 |
| Fond du Lac 14916 | 323 |
| Fond du Lac 14975 | 355 |
| Fond du Lac River 14916 | 323 |
| Food and Drug Administration (FDA) | 6 |
| Food and Drug Administration (FDA) Regional Offices | 380 |
| Ford River 14915 | 326 |
| Ford River, Mich. 14915 | 326 |
| Ford Shoals 14803 | 132 |
| Forest Bay 14862 | 221 |
| Forester, Mich. 14862 | 221 |
| Forestville, Mich. 14862 | 221 |
| Forks, The 14929 | 272 |
| Fort Edward, N.Y. 14786 | 369 |
| Fort Erie, Ont. 14833 | 149 |
| Fort Gratiot Light 14852, 14853 | 215, 220 |
| Fort Mississauga, Ont. 14816 | 137 |
| Fort Niagara Light 14816 | 139 |
| Fort Niagara, N.Y. 14816 | 137 |
| Fort Ticonderoga 14784 | 371 |
| Forty Mile Point 14881 | 232 |
| Four Brothers, The 14783 | 372 |
| Four Foot Shoal 14909 | 314 |
| Four Mile Point *2077 | 139 |
| Fourteen Foot Shoal 14881 | 233 |
| Fourteen Mile Point 14965 | 351 |
| Fox Island 14802 | 128 |
| Fox Point 14904 | 305 |
| Fox River 14916 | 320, 323 |
| Fox River 14916, 14918 | 317 |
| Francis Island 14967, 14968 | 365 |
| Frankfort Harbor 14907 | 251 |
| Frankfort, Mich. 14907 | 251 |
| Frechette Point 14883, 14884 | 333 |
| Freda 14964, 14965 | 351 |
| Fremont, Ohio 14842 | 181 |
| French River 14966 | 364 |
| Frequency units | 12 |
| Frog Creek 14853 | 206 |
| Frontenac Shoal 14772 | 123 |
| Frying Pan Island 14882 | 332 |
| Frying Pan Shoal 14882 | 331 |
| Frying Pan Shoal 14910, 14918 | 317 |
| Fuller Bay 14802 | 128 |
| | |
| Gaffney Point 14882 | 330, 332 |
| Galien River 14905 | 268 |
| Galloo Island 14802 | 130 |
| Galloo Shoal 14802 | 130 |
| Galop Island 14763 | 119 |
| Gananoque | 122 |
| Gananoque River 14774 | 122 |
| Gananoque, Ont. 14774 | 122 |
| Garden Bay 14908 | 327 |
| Garden Bluff 14908 | 327 |
| Garden Island 14911 | 249 |
| Garden Island Shoal 14911 | 249 |
| Garden Peninsula 14908 | 315 |
| Gary Harbor 14927 | 271 |

| | Page |
|---|---|
| Gaukler Point 14853 | 205 |
| Gay, Mich. 14964 | 349 |
| Genesee River | 369 |
| Genesee River 14815 | 133 |
| Geodetic Reference System 1980 (GRS 80) | 16 |
| Geographic range | 21 |
| Gibraltar Island 14844, 14842 | 190 |
| Gibraltar, Mich. 14853, 14848 | 197 |
| Gill Harbor 14802 | 130 |
| Gills Rock, Wis. 14909 | 316 |
| Gladstone, Mich. 14915 | 326 |
| Glen Cove 14880 | 238 |
| Glen Haven, Mich. 14912 | 251 |
| Glencoe Shoal 14905 | 293 |
| Glenlyon Shoal 14976 | 368 |
| Goat Island 14832 | 147 |
| Good Harbor Bay 14912 | 250 |
| Good Harbor Bay 14967 | 365 |
| Goose Bay 14772 | 122 |
| Goose Island 14885 | 237 |
| Goose Island Shoal 14885 | 237 |
| Goose Neck Island Shoals 14762 | 118 |
| Gooseberry Reef 14966 | 364 |
| Gooseberry River 14966 | 364 |
| Government Agencies (Canada) | 31 |
| Government Agencies (United States) | 2 |
| Government Printing Office | 375 |
| GPS Navigation System | 24 |
| GPS System | 25 |
| Grace Harbor 14976 | 366 |
| Grace Island 14976 | 366 |
| Graham Point 14881 | 237 |
| Grand Calumet River 14927, 14926 | 275 |
| Grand Haven, Mich. 14933 | 258 |
| Grand Island 14832 | 147 |
| Grand Island 14969 | 345 |
| Grand Island Harbor 14969 | 345 |
| Grand Isle 14781, 14782 | 373 |
| Grand Marais Harbor 14967 | 365 |
| Grand Marais, Mich. 14962 | 344 |
| Grand Marais, Minn. 14967 | 365 |
| Grand Portage Bay 14967, 14968 | 365 |
| Grand Portage Island 14967, 14968 | 365 |
| Grand Portal Point 14963 | 345 |
| Grand River 14837 | 167 |
| Grand River 14933 | 258 |
| Grand Sable 14962, 14963 | 344 |
| Grand Traverse Bay 14913 | 246 |
| Grand Traverse Bay 14964 | 349 |
| Grand Traverse Bay Harbor 14964 | 349 |
| Grand Traverse Light 14913 | 248 |
| Granite Island 14963 | 347 |
| Granite Point 14963 | 347 |
| Granite Point 14966 | 363 |
| Granite State Shoals 14773 | 123 |
| Grass Island 14803 | 132 |
| Grass River 14761 | 118 |
| Grassy Island 14853, 14848 | 196 |
| Grassy Island 14918 | 318 |
| Grassy Point 14975 | 355 |
| Gravel Island 14882 | 239 |
| Gravelly Bay 14822, *2042 | 143 |
| Gravelly Island 14909 | 316 |
| Gravelly Island Shoals 14909 | 316 |
| Gravelly Point 14863 | 227 |
| Gravelly Shoal Light 14863 | 227 |
| Grays Reef 14911 | 249 |
| Grays Reef Light 14911 | 249 |
| Grays Reef Passage 14911 | 249 |
| Great Chazy River 14781 | 373 |
| Great Lakes Maritime Academy 14913 | 247 |
| Great Lakes Naval Training Center Harbor 14905 | 293 |
| Great Lakes Pilotage Regulations | 103 |
| Great Lakes-Hudson River Waterway Improvement | 369 |
| Great Sand Bay 14964 | 351 |
| Great Sodus Bay 14814 | 133 |
| Green 14965 | 351 |
| Green Bay 14902 | 315 |
| Green Bay Harbor 14916, 14918 | 317 |
| Green Bay, Wis. 14916, 14918 | 317 |
| Green Island 14844, 14842 | 191 |
| Green Island 14881 | 329 |
| Green Island 14909 | 325 |
| Green Island 14976 | 367 |
| Green Point 14867 | 223 |
| Greenbush, Mich. 14864 | 229 |
| Greilickville 14913 | 248 |
| Grenadier Island 14765 | 122 |
| Grenadier Island 14802 | 128 |
| Grindstone City, Mich. 14863 | 221 |
| Grindstone Island 14773, 14774 | 123 |
| Gros Cap 14881 | 329 |
| Gros Cap Reefs 14884 | 340 |
| Gros Cap Reefs Light, Ont. 14884 | 340 |
| Gros Cap, Ont. 14884 | 340 |
| Grosse Ile, MI 14853 | 196 |
| Grosse Point 14881 | 237 |
| Grosse Point 14972 | 348 |
| Grosse Point Shores 14853 | 205 |
| Grosse Pointe 14853 | 205 |
| Grosse Pointe Farms 14853 | 205 |
| Grosse Pointe Park 14853 | 205 |
| Grossepoint Light 14926, 14927 | 293 |
| Guffin Bay 14811 | 129 |
| Guffin Creek 14811 | 129 |
| Gull Island 14811 | 129 |
| Gull Island 14869 | 231 |
| Gull Island 14909 | 316 |
| Gull Island 14911 | 250 |
| Gull Island 14967 | 364 |
| Gull Island 14973 | 354 |
| Gull Island Reef 14911 | 250 |
| Gull Island Shoal 14844 | 191 |
| Gull Island Shoal 14973 | 354 |
| Gull Islands 14968 | 367 |
| Gull Rock 14964 | 350 |
| Gull Rocks 14976 | 366 |
| Halfway Creek 14847, 14846 | 189 |
| Hammond Bay 14881 | 232 |
| Hammond Bay Harbor 14881 | 232 |
| Hancock, Mich. 14972 | 349 |
| Hanover Shoal 14909 | 317 |
| Harbor Beach, Mich. 14862 | 221 |
| Harbor Point 14913 | 245 |
| Harbor Springs, Mich. 14913 | 245 |
| Harbormasters | 113 |
| Harkness Island 14763 | 119 |
| Harlem Reef 14976 | 368 |
| Harrisville Harbor 14864 | 229 |
| Harrisville, Mich. 14864 | 229 |
| Harsens Island, MI 14852, 14853 | 213 |
| Harwood Point 14883 | 332 |
| Haskell Shoal 14771 | 122 |
| Hat Island 14909 | 317 |
| Hat Island 14911 | 249 |
| Hat Island 14976 | 367 |
| Hat Point 14863 | 222 |
| Hat Point 14967, 14968 | 365 |
| Hat Point Reef 14863 | 222 |
| Hawk Island 14976 | 366 |
| Hay Point 14882 | 330, 332 |
| Head, The 14976 | 368 |
| Hearding Island 14975 | 360 |
| Hedgehog Harbor 14909 | 316 |
| Heights | 2 |
| Heisterman Island 14863 | 223 |
| Helicopter evacuation | 11 |
| Hen Island 14844 | 191 |
| Hen Island Shoal 14844 | 191 |

| | Page |
|---|---|
| Henderson Bay 14811 | 129 |
| Henderson Harbor 14811 | 129 |
| Herbster, Wis. 14966 | 355 |
| Hermit Island 14973 | 353 |
| Hessel, Mich. 14885 | 237 |
| Hickory Island 14774 | 125 |
| High Cliff State Park 14916 | 323 |
| High Island 14911 | 250 |
| High-Cliff Park 14919 | 317 |
| Hika 14903 | 309 |
| Hill Point 14976 | 367 |
| Hills Point 14919 | 314 |
| Hinckley Flats Shoal 14767, 14768 | 125 |
| Hog Island 14909 | 315 |
| Hog Island 14911 | 249 |
| Hog Island Reef 14911 | 249 |
| Holdridge Shoal 14882 | 239 |
| Hole-in-the-Wall 14853, 14848 | 196 |
| Holidays | 113 |
| Holland Harbor 14932 | 260 |
| Holland, Mich. 14932 | 260 |
| Hopkins Harbor 14976 | 367 |
| Horizontal Datum | 16 |
| Hornes Point 14768 | 125 |
| Horse Island 14811 | 129 |
| Horse Shoe Pond 14835 | 161 |
| Horseshoe Falls 14816 | 139 |
| Horseshoe Falls 14832 | 147 |
| Horseshoe Island 14768 | 125 |
| Horseshoe Island 14909 | 317 |
| Horseshoe Point 14910 | 317 |
| Horseshoe Reef 14882 | 239 |
| Horseshoe Reefs 14909 | 317 |
| Hospital Creek 14784 | 371 |
| Houghton Point 14973 | 352 |
| Houghton, Mich. 14972 | 349 |
| Hovland 14967 | 365 |
| Howards Bay 14975 | 355 |
| Hubbell 14972 | 349 |
| Hudson River 12335, 12341, 12345, 12346, 12343, 12347, 12348 | 369 |
| Hughes Point 14911 | 328 |
| Humphrey Rock 14880 | 238 |
| Huron Bay 14882 | 239 |
| Huron Bay 14964 | 347 |
| Huron Bay, Mich. 14964 | 347 |
| Huron Harbor 14843 | 179 |
| Huron Islands 14964 | 347 |
| Huron Mountains 14964 | 347 |
| Huron River 14843 | 179 |
| Huron River 14846 | 194 |
| Huron River Point 14964 | 347 |
| Huron, Ohio 14843 | 179 |
| Hutchinson Shoal 14964 | 351 |
| Hyde Park Inner Shoal 14927, 14926 | 279 |
| Hyde Park Outer Shoal 14927 | 279 |
| Hydrographic survey source diagrams | 17 |
| | |
| Ice | 111 |
| Ile aux Galets 14911 | 249 |
| Illinois River | 286 |
| Illinois Waterway | 286 |
| Immigration and Naturalization Service | 6 |
| Immigration and Naturalization Service Offices | 380 |
| Independence Point 14811 | 129 |
| Indian Point 14908 | 327 |
| Indian Point 14935 | 254 |
| Indian River 14886 | 235 |
| Indiana Dunes National Lakeshore 14905 | 270 |
| Indiana Harbor 14929 | 272 |
| Indiana Harbor Canal 14929 | 272 |
| Indiana Shoals 14927 | 272 |
| Ingallston 14909 | 325 |
| Inland Route 14886 | 234 |
| Inland Waterways Navigation Regulations | 64 |
| Inner Ironsides Shoal 14772 | 122 |

| | Page |
|---|---|
| International Bridge 14833, 14832 | 149 |
| International Code of Signals | 376 |
| International Great Lakes Datum 1985 (IGLD1985) | 16 |
| Irondequoit Bay 14804 | 133 |
| Ironsides Island 14772 | 122 |
| Ironsides Shoal 14772 | 122 |
| Ironton 14942 | 246 |
| Ironwood Island 14973 | 354 |
| Iroquois Dam 14763 | 119 |
| Iroquois Lock 14763 | 119 |
| Iroquois, Ont. 14763 | 119 |
| Irvine Point 14767 | 125 |
| Island Harbor 14882 | 239 |
| Island No. 1 14883, 14884 | 333 |
| Island No. 3 14883, 14884 | 333 |
| Isle Royale 14976 | 366 |
| Isle Royale Light 14976 | 368 |
| Isle Royale National Park 14976 | 366 |
| Ithaca, N.Y. 14791 | 369 |
| Ivy Lea, Ont. 14772 | 122 |
| | |
| Jackson Harbor 14909 | 315 |
| Jackson Park Harbor 14926 | 279 |
| Jacksonport, Wis. 14910 | 314 |
| Jeannettes Creek 14850 | 208 |
| Johns Island 14976 | 366 |
| Johnson Island 14844, 14842 | 181 |
| Johnson Point 14883 | 332 |
| Johnson Shoal 14811 | 129 |
| Johnston Channel 14852 | 212 |
| Jones Island 14924 | 299 |
| Jorstadt Island 14771 | 122 |
| | |
| Kalamazoo Lake 14906 | 263 |
| Kalamazoo River 14906 | 263 |
| Kankakee River | 286 |
| Kaukauna, Wis. 14916 | 322 |
| Kawkawlin River 14867 | 226 |
| Kelleys Island 14844, 14842 | 190 |
| Kelleys Island Shoal 14844, 14842 | 191 |
| Kenosha Harbor 14904 | 294 |
| Kenosha, WI 14904 | 294 |
| Kewaunee River 14903 | 312 |
| Kewaunee Shoal 14903 | 312 |
| Kewaunee, Wis. 14903 | 312 |
| Keweenaw Bay 14964, 14971 | 347 |
| Keweenaw Bay, Mich. 14971 | 348 |
| Keweenaw Peninsula 14964 | 348 |
| Keweenaw Point 14964 | 350 |
| Keweenaw Waterway 14972 | 348 |
| Keystone Bay 14964 | 350 |
| Kingston Harbour *2017, 14768 | 123 |
| Kingston, Ont. *2017, 14768 | 123 |
| Kinnickinnic River 14924 | 299 |
| Knife Island 14966 | 363 |
| Knife River 14966 | 363 |
| Knife River, Minn. 14966 | 363 |
| | |
| L'Anse Bay 14971 | 347 |
| L'Anse, Mich. 14971 | 348 |
| La Chute 14784 | 371 |
| La Plaisance Bay 14830, 14846 | 189 |
| La Plaisance Creek 14830, 14846 | 189 |
| La Pointe Harbor 14973 | 353 |
| La Pointe Light 14973 | 352 |
| La Pointe, Wis. 14973 | 353 |
| La Salle Island 14885 | 237 |
| La Salle, Ont. 14853, 14848 | 196 |
| Lac La Belle 14964 | 350 |
| Lac La Belle Harbor 14964 | 350 |
| Lackawanna Canal 14833 | 154 |
| Lafayette Point 14881 | 236 |
| Lake Butte des Morts 14916 | 323 |
| Lake Calumet 14929 | 275 |
| Lake Champlain 14784, 14783, 14782, 14781 | 371 |

| | Page |
|---|---|
| Lake Charlevoix 14942 | 246 |
| Lake Erie 14820 | 145 |
| Lake Erie Metropark Marina 14853 | 197 |
| Lake Fleet Islands, The 14773 | 122 |
| Lake George 14883 | 330, 333 |
| Lake George Branch 14929 | 272 |
| Lake Huron 14860 | 218 |
| Lake Leelanau 14912 | 250 |
| Lake Linden 14972 | 349 |
| Lake Macatawa 14932 | 260 |
| Lake Michigan 14900, 14901 | 240 |
| Lake Nicolet 14883 | 330, 333 |
| Lake Ontario 14800 | 126 |
| Lake Skegemog 14913 | 247 |
| Lake St. Clair 14850, 14851 | 204 |
| Lake St. Clair Light 14850 | 204 |
| Lake St. Lawrence 14761 | 118 |
| Lake Superior 14961 | 341 |
| Lake Weather Broadcasts (LAWEB) | 13, 379 |
| Lake Winnebago 14916 | 320, 322 |
| Lakeside, Ohio 14844, 14842 | 182 |
| Lakewood, Ohio 14826, 14829 | 177 |
| Lambton Generating Station | 214 |
| Lame Squaw Island 14763 | 119 |
| Lamoille River 14782 | 373 |
| Lansing Shoals 14911 | 249 |
| Larus Island 14970 | 347 |
| Laughing Fish Point 14963 | 345 |
| Laura Grace Rock 14967, 14968 | 366 |
| Lee Point 14913 | 248 |
| Leek Island 14774 | 122 |
| Leelanau Peninsula 14913 | 246 |
| Legal public holidays | 113 |
| Leland River 14912 | 250 |
| Leland, Mich. 14912 | 250 |
| LeRoy Island 14814 | 133 |
| Leroys Point 14909 | 317 |
| Les Cheneaux Islands 14885 | 237 |
| Leveaux Mountain 14967 | 365 |
| Lewis Shoal 14804 | 136 |
| Lewiston, N.Y. 14816 | 139 |
| Lexington, Mich. 14862 | 220 |
| Light and fog signal characteristics | 2 |
| Light Lists | 3 |
| Light Lists (United States and Possessions) | 376 |
| Lighthouse Point 14881 | 236 |
| Lighthouse Point 14913 | 248, 250 |
| Lighthouse Point 14970 | 346 |
| Lighthouse Reef 14916 | 322 |
| Lights | 21 |
| Lily Pond Harbor of Refuge 14972 | 349 |
| Lime Barrel Shoal 14811 | 129 |
| Lime Island 14882 | 332 |
| Lime Kiln Point 14881 | 233 |
| Linda Island 14767 | 125 |
| Lindsay Bank 14880 | 238 |
| List of Lights (Foreign Countries) | 376 |
| Little Bay de Noc 14908, 14915 | 326 |
| Little Calumet River 14927 | 286 |
| Little Charity Island 14863 | 222 |
| Little Chicken Island 14844 | 191 |
| Little Galloo Island 14802 | 130 |
| Little Girls Point 14965 | 351 |
| Little Grand Marais Harbor 14964 | 350 |
| Little Gull Island 14909 | 316 |
| Little La Salle Island 14885 | 237 |
| Little Lake 14962 | 344 |
| Little Lake Harbor 14962 | 344 |
| Little Manitou Island 14973 | 354 |
| Little Presque Isle (Granite Point) 14963 | 346 |
| Little Rapids Cut 14883, 14884 | 333 |
| Little River 14762 | 119 |
| Little River 14832 | 150 |
| Little River 14909 | 325 |
| Little Round Island 14774 | 123 |

| | Page |
|---|---|
| Little Sable Point 14907 | 254 |
| Little Salmon River 14803 | 130 |
| Little Sand Bay 14973 | 353 |
| Little Sodus Bay 14803 | 132 |
| Little Sturgeon Bay 14910 | 317 |
| Little Suamico River 14910 | 324 |
| Little Summer Island 14908, 14909 | 316 |
| Little Summer Island Shoal 14908, 14909 | 316 |
| Little Tail Point 14918 | 324 |
| Little Traverse Bay 14913 | 245 |
| Little Traverse Bay 14964 | 349 |
| Little Traverse Light 14913 | 245 |
| Little Two Harbors 14966 | 364 |
| Livingstone Channel 14853, 14848 | 195 |
| Local magnetic disturbances | 20 |
| Local Notice to Mariners | 2 |
| Lock and Dam, Troy 14786 | 369 |
| Lock, Black Rock 14833, 14832 | 149 |
| Lock, Cheboygan River 14886 | 234 |
| Lock, Chicago 14928 | 282 |
| Lock, Crooked River 14886 | 235 |
| Lock, Davis 14884 | 337 |
| Lock, Eisenhower 14761 | 118 |
| Lock, Iroquois 14763 | 119 |
| Lock, MacArthur 14884 | 337 |
| Lock, O'Brien 14929 | 287 |
| Lock, Poe 14884 | 337 |
| Lock, Sabin 14884 | 337 |
| Lock, Snell 14761 | 118 |
| Locke Point 14976 | 367 |
| Locust Point 14830, 14846 | 182 |
| Lone Brother Island 14771 | 122 |
| Long Beach 14830, 14846 | 183 |
| Long Island 14973 | 352 |
| Long Point 14768 | 125 |
| Long Point 14791 | 369 |
| Long Point 14844, 14842 | 190 |
| Long Sault Islands 14761 | 118 |
| Long Sault Spillway Dam 14761 | 118 |
| Long Tail Point 14918 | 324 |
| Looney Point 14911 | 249 |
| Lorain Harbor 14841 | 177 |
| Lorain, Ohio 14841 | 177 |
| Loran-C information | 25 |
| LORAN-C | 23 |
| Low Water Datum | 16 |
| Lower Black Rock Harbor 14832 | 149 |
| Lower Lakes Terminal 14763 | 119 |
| Lucille Island 14967, 14968 | 365 |
| Ludington Harbor 14937 | 253 |
| Ludington, Mich. 14937 | 253 |
| Luminous range | 21 |
| Lutsen 14967 | 365 |
| Lyons, N.Y. 14786 | 369 |
| | |
| MacArthur Lock 14884 | 337 |
| Macatawa River 14932 | 260 |
| Macatawa, Mich. 14932 | 260 |
| Mackinac Bridge 14881 | 237, 242, 329 |
| Mackinac Island 14881 | 236 |
| Mackinac Island, Mich. 14881 | 236 |
| Mackinaw City, Mich. 14881 | 236, 242 |
| Madeline Island 14973 | 353 |
| Madison Park Shoal 14927 | 279 |
| Magnet Island 14967, 14968 | 365 |
| Magnetic disturbances | 20 |
| Maisou Island 14863 | 223 |
| Majors Shoal 14881 | 237 |
| Malletts Bay 14782 | 373 |
| Malletts Head 14782 | 373 |
| Malone Bay 14976 | 367 |
| Malone Island 14976 | 367 |
| Mamajuda Island 14853, 14848 | 196 |
| Mamajuda Island Shoal 14853 | 196 |
| Manhattan Group 14772 | 123 |

| | Page |
|---|---|
| Manistee Harbor 14938 | 252 |
| Manistee Lake 14938 | 252 |
| Manistee River 14938 | 252 |
| Manistique Harbor 14908 | 328 |
| Manistique River 14908 | 328 |
| Manistique, Mich. 14908 | 328 |
| Manitou Island 14964 | 350 |
| Manitou Island 14973 | 354 |
| Manitou Passage 14912 | 251 |
| Manitou Paymen Shoal 14911 | 329 |
| Manitowoc River 14922 | 309 |
| Manitowoc Shoal 14922 | 310 |
| Manitowoc, Wis. 14922 | 309 |
| Marble Head 14880 | 238 |
| Marble Point 14973 | 352 |
| Marina Island 14905, 14930 | 268 |
| Marina Shoal 14973 | 354 |
| Marina, Lake Erie Metropark 14853 | 197 |
| Marine Broadcast Notices to Mariners | 2 |
| Marine City, Mich. 14852, 14853 | 213 |
| Marine Forecasts (MAFOR) | 15, 379 |
| MARINE POLLUTION | 26 |
| Marine Product Dissemination Information | 12, 376 |
| Marine Weather Services Charts | 15, 376 |
| Marinette, Wis. 14917 | 325 |
| Marion Island 14913 | 247 |
| Maritime Academy, Great Lakes 14913 | 247 |
| Maritime Radio Users Handbook | 376 |
| Marquette Bay 14963, 14970 | 346 |
| Marquette Harbor 14970 | 346 |
| Marquette Island 14885 | 237 |
| Marquette Light | 346 |
| Marquette Lower Harbor 14970 | 346 |
| Marquette Upper Harbor 14970 | 346 |
| Marquette, Mich. 14970 | 346 |
| Marr Island 14967 | 365 |
| Martin Island 14850 | 207, 212 |
| Martin Point 14844 | 181 |
| Martin Reef 14882 | 238 |
| Massena Canal 14761 | 118 |
| Massena, N.Y. 14761 | 118 |
| Maumee Bay 14847 | 183 |
| Maumee River 14847, 14846 | 183 |
| McCargoe Cove 14976 | 367 |
| McGinty Cove 14976 | 366 |
| McGulpin Point 14881 | 245 |
| McKay Bay 14885 | 238 |
| McNair Island 14764 | 121 |
| McNeil Cove 14783 | 372 |
| Meade Island 14882 | 239 |
| Medical advice and/or evacuation | 12 |
| Memorial, Perrys Victory and International Peace 14842 | 190 |
| Menagerie Island 14976 | 368 |
| Menasha, Wis. 14916 | 322 |
| Menekaunee Point 14962 | 344 |
| Menekaunee Shoal 14909 | 325 |
| Menominee River 14917 | 325 |
| Menominee Shoal 14917 | 325 |
| Menominee, Mich. 14917 | 325 |
| Menomonee River 14924 | 299 |
| Mentor Harbor 14825, 14829 | 169 |
| Mercator projection | 20 |
| Merril Point 14913 | 247 |
| Meso Island 14853, 14848 | 196 |
| Metro Beach Metropark 14853 | 205 |
| Metropolitan Beach 14853 | 205 |
| Mexico Bay 14803 | 130 |
| Michigan City, Ind. 14905 | 268 |
| Michigan Island 14973 | 353 |
| Middle Bass Island 14844, 14842 | 191 |
| Middle Bay 14970 | 347 |
| Middle Bluff 14908 | 327 |
| Middle Channel 14852, 14853 | 213 |
| Middle Entrance 14885 | 237 |
| Middle Grounds Island 14863 | 223 |
| Middle Harbor Shoal 14844 | 182 |
| Middle Island 14844 | 191 |
| Middle Island 14869 | 231 |
| Middle Islands Passage 14976 | 367 |
| Middle Neebish Channel 14883 | 333 |
| Middle Shoal 14911 | 249 |
| Middle Sister Island 14830 | 191 |
| Milk River 14853 | 205 |
| Millecoquins Point 14911 | 328 |
| Millecoquins Reefs 14911 | 329 |
| Millen Bay 14767 | 125 |
| Miller Bay 14916 | 323 |
| Milwaukee Bay 14904 | 298 |
| Milwaukee Harbor 14924 | 298 |
| Milwaukee River 14924 | 298 |
| Milwaukee, Wis. 14924 | 298 |
| Miners Castle Point 14969 | 345 |
| Minneapolis Shoal 14908, 14909 | 327 |
| Minnesota Channel 14975 | 355 |
| Minnesota Point 14975 | 355 |
| Mirre Point 14883 | 332 |
| Misery Bay 14835 | 161 |
| Misery Bay 14869 | 231 |
| Misery Bay 14965 | 351 |
| Mission Hill 14884 | 343 |
| Mission Point 14881 | 236 |
| Mission Point 14883, 14884 | 333 |
| Mission Point Light 14913 | 247 |
| Missisquoi Bay 14781 | 373 |
| Missisquoi River 14781 | 373 |
| Mississippi River | 286 |
| Mitchells Point 14850 | 207 |
| Mohawk River 14786 | 369 |
| Mona Lake 14906 | 258 |
| Monroe Harbor 14830, 14846 | 189 |
| Montague, Mich. 14935 | 254 |
| Montour Falls, N.Y. 14791 | 369 |
| Montreal River 14973 | 351 |
| Montrose Harbor 14926 | 293 |
| Monument Shoal 14910 | 317 |
| Moon Island 14883 | 333 |
| Mooney Bay 14781 | 373 |
| Moonlight Bay 14909 | 314 |
| Mooretown, Ont. 14852, 14853 | 214 |
| Moosecamp Lake | 355 |
| Morgan Shoal 14927, 14926 | 279 |
| Morrisburg, Ont. 14762 | 119 |
| Morrison Channel 14930 | 268 |
| Morristown, N.Y. 14770 | 121 |
| Moses-Saunders Power Dam 14761 | 118 |
| Mott Island 14976 | 367 |
| Mount Bohemia 14964 | 350 |
| Mount Clemens, Mich. 14853 | 205 |
| Mount Desor 14976 | 366 |
| Mount Houghton 14964 | 350 |
| Mount Josephine 14967, 14968 | 365 |
| Mouse Island 14844, 14842 | 182, 190 |
| Mouse Island Reef 14844, 14842 | 190 |
| Mud Bay 14802 | 128 |
| Mud Island, MI 14854 | 196 |
| Muddy Creek Bay 14842 | 181 |
| Mudge Creek 14804 | 133 |
| Mullet Creek Bay 14773 | 123 |
| Mullett Lake 14886 | 234 |
| Munising Harbor 14969 | 345 |
| Munising, Mich. 14969 | 345 |
| Munuscong Channel 14883 | 332 |
| Munuscong Lake 14882, 14883 | 330, 332 |
| Murphy Islands 14762 | 118 |
| Murphy Shoal 14762 | 118 |
| Murray Bay 14969 | 345 |
| Muskegon Harbor 14934 | 256 |
| Muskegon Lake 14934 | 256 |
| Muskegon River 14934 | 256 |
| Muskegon, Mich. 14934 | 256 |

| | Page |
|---|---|
| Nahma, Mich. 14908 | 327 |
| Naomikong Point 14962 | 344 |
| Narrow channels | 27 |
| National Data Buoy Center Meteorological Buoys | 2 |
| National Environmental Satellite, Data, and Information Service (NESDIS) | 5 |
| National Imagery and Mapping Agency | 2 |
| National Imagery and Mapping Agency (NIMA) | 4 |
| National Imagery and Mapping Agency Procurement Information | 375 |
| National Institute of Standards and Technology (NIST) | 15 |
| National Lakeshore, Apostle Islands 14973 | 353 |
| National Lakeshore, Indiana Dunes 14905 | 270 |
| National Lakeshore, Pictured Rocks 14963 | 345 |
| National Ocean Service (NOS) | 2 |
| National Ocean Service Offices | 375 |
| National Park, Isle Royale 14976 | 366 |
| National Weather Service (NWS) | 4 |
| National Weather Service Forecast Offices (WSFOs) | 4 |
| National Weather Service forecasts and warnings | 13 |
| National Weather Service Offices | 4, 379 |
| National Weather Service Port Meteorological Officers (PMOs) | 5, 379 |
| National Weather Service Weather Broadcasts | 379 |
| Naubinway Island 14911 | 328 |
| Naubinway Reef 14911 | 328 |
| Naubinway, Mich. 14911 | 329 |
| Nautical Almanac | 376 |
| Nautical charts | 2, 15 |
| Naval Observatory | 25 |
| Navigation Regulations | 81 |
| Navigation Rules | 376 |
| Navigation Safety Regulations | 69 |
| NAVTEX | 13 |
| NAVTEX Marine Information Broadcasts | 13 |
| Navy Island 14832 | 149 |
| Navy Islands, The 14773 | 122 |
| Navy Point 14811 | 129 |
| Nayanquing Point 14863 | 226 |
| Neebish Island 14883 | 330, 332 |
| Neenah, Wis. 14916 | 322 |
| Nemadji River 14975 | 355 |
| New Baltimore, Mich. 14853 | 206 |
| New Buffalo, Mich. 14905 | 268 |
| New Shoal No. 1 14911 | 248 |
| New Shoal No. 2 14911 | 248 |
| New Shoal No. 3 14911 | 248 |
| New York State Canal System 14786 | 130, 369 |
| New York State Canal System 14832 | 150 |
| New York State Canal, Chart Coverage | 369 |
| Newark Island 14814 | 133 |
| Newaygo, Mich. | 256 |
| Niagara Bar 14816 | 137 |
| Niagara Falls 14832 | 150 |
| Niagara Falls, N.Y. 14832 | 151 |
| Niagara Reef 14830 | 182 |
| Niagara River above Niagara Falls 14832 | 147 |
| Niagara River Below Niagara Falls 14816 | 137 |
| Niagara River Channel 14832 | 147, 150 |
| Niagara Shoal 14773 | 123 |
| Niagara-on-the-Lake, Ont. 14816 | 139 |
| Nicolet Bay (Shanty Bay) 14909 | 317 |
| NIMA | 4 |
| Nine Foot Shoal 14909 | 315 |
| Nine Mile Point 14803 | 130 |
| Ninemile Point 14804 | 133 |
| Ninemile Point 14881 | 232 |
| Ninemile Point 14883 | 333 |
| NIST Time and Frequency Dissemination Services, Special Publication 432 | 15 |
| NOAA Weather Radio | 4, 15, 379 |
| Nodoway Point 14884 | 343 |
| Nominal range | 21 |
| North Albany Point 14869 | 231 |
| North American Datum of 1983 | 16 |
| North Bass Island 14844, 14842 | 191 |
| North Bay 14869 | 232 |
| North Bay 14909 | 314 |
| North Branch 14928, 14926 | 282 |
| North Branch Canal 14928, 14926 | 282 |
| North Canal 14884 | 337 |
| North Cape 14830, 14846 | 189 |
| North Channel 14763 | 119 |
| North Channel 14852, 14853 | 206, 213 |
| North Colborne Island 14774 | 123 |
| North Drisco Shoal 14908, 14909 | 327 |
| North Fox Island 14912 | 250 |
| North Government Island 14976 | 367 |
| North Graham Shoal 14881 | 237 |
| North Grand Island Bridge 14832 | 151 |
| North Harbor 14970 | 346 |
| North Harbour Island 14844 | 191 |
| North Harbour Island Reef 14830 | 191 |
| North Hero Island 14781 | 373 |
| North Island 14863 | 223 |
| North Manitou Island 14912 | 251 |
| North Manitou Shoals 14912 | 251 |
| North McNair Shoal 14764 | 121 |
| North Muskegon, Mich. 14934 | 256 |
| North Point 14864 | 229 |
| North Point 14904 | 305 |
| North Pond 14802 | 130 |
| North Pond 14803 | 130 |
| North Shore Channel 14926 | 282 |
| North Slip 14929 | 274 |
| North Tonawanda, N.Y. 14832 | 150 |
| North Twin Island 14973 | 354 |
| Northerly Island 14927, 14926 | 279 |
| Northport Bay 14913 | 248 |
| Northport Point 14913 | 248 |
| Northport, Mich. 14913 | 248 |
| Notices to Mariners | 2, 376 |
| O'Brien Lock 14929 | 287 |
| Oak Creek 14904 | 298 |
| Oak Creek Harbor 14904 | 298 |
| Oak Island 14771 | 122 |
| Oak Island 14973 | 354 |
| Oak Island Shoal 14973 | 354 |
| Oak Orchard Creek 14805 | 137 |
| Oak Point 14863 | 222 |
| Oak Point 14973 | 352 |
| Oak Point, N.Y. 14770 | 122 |
| Oakland Shoal 14927, 14926 | 279 |
| Observation Point 14903 | 312 |
| Obstructions | 2 |
| Oconto Harbor 14910 | 324 |
| Oconto River 14910 | 324 |
| Oconto Shoal 14910 | 324 |
| Oconto, Wis. 14910 | 324 |
| Ocqueoc River 14881 | 232 |
| Oden Island 14886 | 236 |
| Oden, Mich. 14886 | 236 |
| Ogden Island 14762 | 119 |
| Ogden Slip 14928, 14926 | 282 |
| Ogdensburg, N.Y. 14764 | 120 |
| Ogontz Bay 14908 | 327 |
| Olcott, N.Y. 14810, 14806 | 137 |
| Old Channel 14854 | 198 |
| Old Fort St. Joe Point 14882 | 330 |
| Old Galop Canal 14763 | 119 |
| Old Mackinac Point 14881 | 232, 236, 242 |
| Old Mission Harbor 14913 | 247 |
| Old Mission Point 14913 | 247 |
| Old River 14839 | 169 |
| Oliver 14975 | 355 |
| Omena Bay 14913 | 248 |
| Omena Point 14913 | 248 |
| Omena, Mich. 14913 | 248 |
| Omro, Wis. | 323 |
| Oneida Lake 14786, 14788 | 369 |
| Oneida River 14786 | 369 |
| Onekama, Mich. 14939 | 252 |

| | Page |
|---|---|
| Onondaga Lake 14786 | 369 |
| Ontario Hydro Lambton Generating Station 14852, 14853 | 214 |
| Ontonagon Harbor 14965 | 351 |
| Ontonagon River 14965 | 351 |
| Ontonagon, Mich. 14965 | 351 |
| Optical Phenomena | 111 |
| Orion Rock 14863 | 221 |
| Oronto Creek 14965 | 352 |
| Oscoda 14863 | 228 |
| Oscoda, Mich. 14863 | 228 |
| Oshkosh, Wis. 14916 | 323 |
| Ossineke 14864 | 229 |
| Oswegatchie River 14764 | 120 |
| Oswego Canal 14786 | 132, 369 |
| Oswego Harbor 14813 | 130 |
| Oswego River 14786 | 369 |
| Oswego River 14813 | 130 |
| Oswego, N.Y. 14813 | 130 |
| Ottawa River 14847, 14846 | 188 |
| Ottawa, Ont. *1512 | 123 |
| Otter Creek 14783 | 372 |
| Otter Creek 14846 | 189 |
| Otter Island 14973 | 354 |
| Outer Island 14973 | 354 |
| Outer Island Shoal 14973 | 354 |
| Outer Shoal 14909 | 314 |
| Packaged Marine Pollutants | 27 |
| Packard Point 14881 | 233 |
| Palisade Head 14967 | 364 |
| Parent Bay 14908 | 328 |
| Park, Erma Henderson 14853 | 201 |
| Park, Grosse Pointe 14853 | 205 |
| Park, Thousand Island 14773 | 123 |
| Partridge Bay 14970 | 347 |
| Partridge Island 14970 | 347 |
| Partridge Point 14864 | 229 |
| Passage Island, MI 14968 | 367 |
| Patricks Cove 14850 | 207 |
| Paw Paw River 14930 | 266 |
| Peace Bridge 14833, 14832 | 149 |
| Peace Memorial, Perrys Victory and International 14842 | 190 |
| Peach Orchard Point 14844, 14842 | 190 |
| Peche (Peach) Island, Ont. 14853, 14848 | 201 |
| Pelee Island,Ont. 14844 | 191 |
| Pelee Passage 14830 | 191 |
| Pelkie Reef 14911 | 329 |
| Pellet Island 14967 | 364 |
| Pendills Bay 14962 | 344 |
| Pendills Creek 14884 | 344 |
| Pendleton, N.Y. | 369 |
| Peninsula Point 14915 | 327 |
| Peninsula Point Shoal 14915 | 327 |
| Pensaukee Harbor 14910 | 324 |
| Pensaukee River 14910 | 324 |
| Pensaukee Shoal 14910 | 324 |
| Pentwater Harbor 14907 | 254 |
| Pentwater Lake 14907 | 254 |
| Pentwater River 14907 | 254 |
| Pentwater, Mich. 14907 | 254 |
| Pequaming Bay 14971 | 347 |
| Pequaming, Mich. 14971 | 347 |
| Pere Marquette Lake 14937 | 253 |
| Pere Marquette River 14907 | 253 |
| Perrys Victory and International Peace Memorial 14842 | 190 |
| Perrysburg, Ohio 14846 | 183 |
| Peshtigo Point 14910 | 324 |
| Peshtigo Reef 14910 | 324 |
| Peshtigo River 14910 | 324 |
| Petoskey, Mich. 14913 | 245 |
| Pickerel Channel 14886 | 236 |
| Pickerel Lake 14886 | 236 |
| Picnic Rocks 14970 | 346 |
| Pictured Rocks National Lakeshore 14963 | 345 |
| Pigeon Bay 14967, 14968 | 366 |
| Pigeon Lake 14906 | 260 |
| Pigeon Point 14967, 14968 | 366 |
| Pigeon River 14863 | 222 |
| Pigeon River 14967, 14968 | 366 |
| Pike Bay 14972 | 348 |
| Pike Creek 14850 | 209 |
| Pike Creek 14904 | 294 |
| Pikes Bay 14973 | 353 |
| Pilgrim Point 14972 | 348 |
| Pillar Point 14811 | 128 |
| Pilot Island 14909 | 315 |
| Pilotage | 112, 381 |
| Pinconning Bar 14863 | 227 |
| Pinconning River 14863 | 227 |
| Pinconning, Mich. 14863 | 227 |
| Pine Creek Bay 14932 | 260 |
| Pine River 14852, 14853 | 214 |
| Pine River 14942 | 245 |
| Pine River Point 14964 | 347 |
| Pinnebog River 14863 | 222 |
| Pipe Creek 14916 | 323 |
| Pipe Island 14882 | 332 |
| Pipe Island Shoal 14882 | 332 |
| Pipe Island Twins 14882 | 332 |
| Pirates Island 14832 | 149 |
| Platte Bay 14912 | 251 |
| Platte River 14907, 14912 | 251 |
| Platte River Point 14907, 14912 | 251 |
| Plattsburgh, N.Y. 14782 | 373 |
| Plum Island 14909 | 315 |
| Poe Lock 14884 | 337 |
| Poe Reef 14881 | 233 |
| Point Abbaye 14964 | 347 |
| Point Abbaye Reef 14964 | 347 |
| Point Alexandria 14768 | 125 |
| Point Anderson 14882 | 239 |
| Point Au Gres 14863 | 227 |
| Point aux Barques 14908 | 328 |
| Point aux Chenes 14881 | 329 |
| Point aux Frenes 14882 | 330, 332 |
| Point Betsie 14907 | 251 |
| Point Breeze Harbor 14805 | 137 |
| Point Breeze, N.Y. 14805 | 137 |
| Point De Froid 14973 | 353 |
| Point De Tour 14882 | 238, 330, 331 |
| Point Detachee 14881 | 236 |
| Point Detour 14908 | 316, 328 |
| Point Detour 14973 | 353 |
| Point Edward, Ont. 14852, 14853 | 216 |
| Point Epoufette 14911 | 329 |
| Point Gratiot 14823 | 160 |
| Point Hennepin 14853, 14848 | 196 |
| Point Houghton 14976 | 368 |
| Point Huron 14853 | 205 |
| Point Iroquois 14884 | 343 |
| Point Iroquois Shoals 14884 | 339 |
| Point Iroquois, MI 14884 | 339 |
| Point Isabelle 14964 | 350 |
| Point La Barbe 14881 | 329 |
| Point Lookout 14863 | 227 |
| Point Lookout Harbor 14863 | 227 |
| Point Marblehead 14844, 14842 | 182 |
| Point Patterson 14911 | 328 |
| Point Pelee, Ont. *2123 | 191 |
| Point Peninsula 14811, 14802 | 128 |
| Point Sable 14910 | 317 |
| Point Salubrious 14811 | 129 |
| Point St. Ignace 14881 | 232 |
| Pointe aux Barques 14863 | 221 |
| Pointe aux Barques Light 14862, 14863 | 221 |
| Pointe aux Chenes 14884 | 330 |
| Pointe aux Pins 14881 | 233 |
| Pointe aux Pins 14884 | 330 |
| Pointe aux Pins, Ont., 14884 | 339 |
| Pointe des Chenes, Ont. 14884 | 339 |

| | Page |
|---|---|
| Pointe Louise 14884 | 339 |
| Pointe Mouillee 14830, 14846 | 190 |
| Pollution from Ships | 26 |
| Pollution-Ocean Dumping | 27 |
| Polyconic projection | 20 |
| Pomeroy Reef 14885, 14881 | 238 |
| Pond, The 14803 | 132 |
| Pont Felix-Gabriel-Marchand *1350 | 374 |
| Porcupine Mountains 14965 | 351 |
| Porcupine Point 14908 | 327 |
| Pork City Hill 14966 | 363 |
| Port Austin Reef 14863 | 221 |
| Port Austin, Mich. 14863 | 222 |
| Port Bay 14804 | 132 |
| Port Clinton, Ohio 14830, 14846 | 182 |
| Port Colborne 14822, *2042 | 143, 144 |
| Port Dolomite, Mich. 14885 | 238 |
| Port Gypsum 14863 | 227 |
| Port Henry, N.Y. 14784 | 371 |
| Port Hope, Mich. 14862 | 221 |
| Port Huron, Mich. 14852, 14853 | 215 |
| Port Inland 14911 | 328 |
| Port Kent, N.Y. 14782 | 373 |
| Port Lambton, Ont. 14852, 14853 | 213 |
| Port Ontario 14803 | 130 |
| Port Robinson | 143 |
| Port Sanilac, Mich. 14862 | 220 |
| Port Series of the United States | 376 |
| Port Sheldon 14906 | 260 |
| Port Superior Village, Wis. 14973 | 353 |
| Port Washington, Wis. 14904 | 305 |
| Port Weller Harbour *2042 | 139 |
| Port Weller Harbour, Ont. *2042 | 139 |
| Port Wing, Wis. 14966 | 355 |
| Portage Bay 14908 | 328 |
| Portage Lake 14939 | 252 |
| Portage Lake 14972 | 348 |
| Portage River 14830, 14846 | 182 |
| Portage River 14972 | 348 |
| Portage River 14972, 14964 | 347 |
| Portage River Harbor of Refuge 14972 | 348 |
| Portage-Burns Waterway 14926 | 271 |
| Porte des Morts Passage 14909 | 315 |
| Portland Point 14791 | 369 |
| Ports and Waterways Safety-General | 54 |
| Potable Water Intakes | 2, 108 |
| Potagannissing Bay 14882 | 238 |
| Potter Point 14869 | 231 |
| Potter Reef 14911 | 329 |
| Poultney River 14784 | 371 |
| Poverty Island 14909 | 316 |
| Poverty Island Passage 14909 | 316 |
| Poverty Island Shoal 14909 | 316 |
| Powell Point 14969 | 345 |
| Prairie Cove 14904 | 294 |
| Preparations for being towed by Coast Guard | 12 |
| Prescott, Ont. 14764 | 120 |
| Presque Isle 14835 | 161 |
| Presque Isle 14869 | 231 |
| Presque Isle Bay 14835 | 161 |
| Presque Isle Bay 14973 | 353 |
| Presque Isle Harbor 14869 | 231 |
| Presque Isle Harbor 14970 | 346 |
| Presque Isle Point 14970 | 346 |
| Presque Isle Point 14973 | 353 |
| Presque Isle Point Rocks 14970 | 346 |
| Public Health Service | 6 |
| Public Health Service Quarantine Stations | 380 |
| Puce River 14850 | 209 |
| Puce River Harbour 14850 | 209 |
| Pullman Shoal 14772 | 123 |
| Pultneyville, N.Y. 14804 | 133 |
| Punts, The 14774 | 122 |
| Put-In-Bay 14844, 14842 | 190 |
| Put-In-Bay, Ohio 14844, 14842 | 190 |

| | Page |
|---|---|
| Pyramid Point 14912 | 250 |
| Pyramid Point Shoal 14912 | 250 |
| Quanicassee River 14863 | 223 |
| Quarantine stations | 380 |
| Quarantine stations, human | 380 |
| Quarantine, animal | 6, 380 |
| Quarantine, human | 6, 380 |
| Quarantine, plant | 6, 380 |
| Quarry Bay 14973 | 353 |
| Quarry Point 14864, 14880 | 232 |
| Queenston, Ont. 14816 | 139 |
| Rabbit Back Peak 14881 | 237 |
| Raber Bay 14882 | 332 |
| Raber Point 14882 | 332 |
| Racine Harbor 14925 | 297 |
| Racine Reef 14925 | 297 |
| Racine, Wis. 14925 | 297 |
| Radar | 27 |
| Radar beacons (Racons) | 23 |
| Radar reflectors on small craft | 12 |
| Radio aids to navigation | 2 |
| Radio bearings | 23 |
| Radio distress procedures | 7 |
| Radio navigation warnings and weather | 12 |
| Radio Navigational Aids | 376 |
| Radiobeacons | 23 |
| RADIONAVIGATION USER INFORMATION | 25 |
| Radiotelephone channels | 28 |
| Radiotelephone Communication, Bridge to Bridge | 28 |
| Raft Narrows 14772 | 122 |
| Rameys Bend 14822, *2042 | 143 |
| Ranges | 2 |
| Rankin Creek 14850 | 207 |
| Rapid River 14915 | 327 |
| Raquette River 14761 | 118 |
| Raspberry Bay 14973 | 353 |
| Raspberry Island 14973 | 354 |
| Raspberry Point 14973 | 353 |
| Rattlesnake Island 14844, 14842 | 191 |
| Rawley Point 14903 | 312 |
| Raynolds Point 14880 | 238 |
| Raynolds Reef 14881 | 236 |
| Red Banks, Wis. 14910 | 317 |
| Red Cliff Bay 14973 | 353 |
| Red Cliff Point 14973 | 353 |
| Redridge 14964, 14965 | 351 |
| Reeds Bay 14768 | 125 |
| Refugee Island 14770 | 121 |
| Regulated Navigation Areas and Limited Access Areas | 78 |
| Reported information | 2 |
| Reports from ships | 15 |
| Restricted areas | 4 |
| Rices Point 14975 | 355 |
| Richards Reef 14911 | 250 |
| Rifle Bar 14863 | 227 |
| Rifle River 14863 | 227 |
| Ripley Shoal 14908 | 327 |
| Ripley, Mich. 14972 | 349 |
| River Raisin 14830, 14846 | 189 |
| River Rouge 14854 | 198 |
| Riviere Richelieu *1350, *1351 | 374 |
| Roberts Landing, Mich. 14852, 14853 | 213 |
| Robinson Bay 14976 | 367 |
| Rochester Harbor 14815 | 133 |
| Rochester, N.Y. 14815 | 133 |
| Rock Harbor 14976 | 367 |
| Rock Harbor Lodge 14976 | 367 |
| Rock Island 14909 | 316 |
| Rock Island 14967 | 365 |
| Rock Island Passage 14909 | 316 |
| Rock Island Reef 14773 | 123 |
| Rock of Ages Light 14976 | 366 |
| Rockport, Mich. 14869 | 231 |

| | Page |
|---|---|
| Rockport, Ont. 14772 | 122 |
| Rockway Point 14763 | 119 |
| Rocky Island 14908 | 316 |
| Rocky Island 14973 | 354 |
| Rocky River 14826, 14829 | 177 |
| Rocky River Harbor 14826, 14829 | 177 |
| Rogers City, Mich. 14864 | 232 |
| Roman Point 14966 | 355 |
| Root River 14925 | 297 |
| Rose Shoal 14911 | 248 |
| Ross Island 14976 | 367 |
| Round Island 14881 | 236 |
| Round Island 14882 | 332 |
| Round Island 14908 | 327 |
| Round Island Passage 14881 | 236 |
| Round Lake 14942 | 246 |
| Rouses Point, N.Y. 14781 | 373 |
| Routes | 112 |
| Rowley Bay 14909 | 314 |
| Roys Point 14973 | 353 |
| Rumsey Shoal 14816 | 137 |
| Ruscom River 14850 | 208 |
| Russell Island, MI, 14852, 14853 | 213 |
| Sabin Lock 14884 | 337 |
| Sabin Point 14803 | 132 |
| Sac Bay 14908 | 328 |
| Sackets Harbor, N.Y. 14811 | 129 |
| Safe Water Lighted Buoy 14847, 14846 | 183 |
| Saganing Bar 14863 | 227 |
| Saganing River 14863 | 226 |
| Saginaw Bay 14863 | 222 |
| Saginaw River 14867 | 223 |
| Saginaw, Mich. 14867 | 223 |
| Sail Rock 14969 | 345 |
| Sailing Directions (Foreign Countries) | 376 |
| Saint Lawrence Seaway Development Corporation | 107, 381 |
| Saint-Jean-sur-Richelieu *1350 | 374 |
| Sales agents | 2 |
| Sales Information | 375 |
| Salmon Creek 14804 | 133 |
| Salmon River 14803 | 130 |
| Salmon Trout Point 14964 | 347 |
| Salt Point 14962 | 344 |
| Salt River 14853 | 206 |
| Sand Bay 14908 | 328 |
| Sand Bay 14909 | 314 |
| Sand Bay 14971 | 347 |
| Sand Island 14973 | 354 |
| Sand Island Shoals 14973 | 354 |
| Sand Point 14814 | 133 |
| Sand Point 14863 | 222, 223 |
| Sand Point 14915 | 326 |
| Sand Point 14969 | 345 |
| Sand Point 14971 | 347 |
| Sand Point 14973 | 353 |
| Sand River 14963 | 346 |
| Sand River 14973 | 354 |
| Sandusky Bay 14842 | 181 |
| Sandusky Harbor 14845 | 180 |
| Sandusky River 14842 | 181 |
| Sandusky, Ohio 14845 | 180 |
| Sandy Creek 14830, 14846 | 189 |
| Sandy Pond 14803 | 130 |
| Sarnia Harbour 14852, 14853 | 216 |
| Sarnia, Ont. 14852, 14853 | 216 |
| SARSAT | 8 |
| SATELLITE POSITION INDICATING RADIO BEACON (EPIRB) | 8 |
| Saugatuck Harbor 14906 | 263 |
| Saugatuck, Mich. 14906 | 263 |
| Sauk Creek 14904 | 305 |
| Sault Ste. Marie (Canada) Canal 14884 | 338 |
| Sault Ste. Marie, Mich. 14884 | 338 |
| Sault Ste. Marie, Ont. 14884 | 339 |
| Saunders Point 14915 | 326 |
| Sawmill Bay 14811 | 129 |
| Sawmill Point 14883 | 333 |
| Sawyer Harbor 14919 | 314 |
| Saxon Harbor 14965 | 352 |
| Scajaquada Creek 14833 | 149 |
| Scammon Cove 14882 | 239 |
| Scammon Point 14882 | 239 |
| Scammons Harbor 14885 | 237 |
| Scarecrow Island 14864 | 229 |
| Schermerhorns Landing 14771 | 122 |
| Schooner Island 14976 | 367 |
| Schroeder 14967 | 365 |
| Scott Middle Ground 14853, 14848 | 200 |
| Scott Point 14844, 14842 | 182 |
| Scott Point 14911 | 328 |
| Scott Point Shoal 14844, 14842 | 190 |
| Scoville Point 14976 | 367 |
| Search and Rescue Telephone Number | 12 |
| Search Bay 14881 | 237 |
| Searchlights | 27 |
| Seaway Handbook | 107 |
| Seaway Island 14852, 14853 | 212 |
| Seaway Notices | 107 |
| Seaway Regulations and Rules | 99 |
| Sebewaing Harbor 14863 | 223 |
| Sebewaing, Mich. 14863 | 223 |
| Seiche | 109 |
| Selkirk 14803 | 130 |
| Seneca Lake 14791 | 369 |
| Seneca River 14786 | 369 |
| Seneca Shoal 14822 | 160 |
| Seul Choix Point 14911 | 328 |
| Sevenmile Point 14913 | 245 |
| Shantee Creek 14847, 14846 | 189 |
| Sheboygan Reef 14922 | 309 |
| Sheboygan River 14922 | 307 |
| Sheboygan, Wis. 14922 | 307 |
| Shelburne Bay 14783 | 373 |
| Shelburne Point 14783 | 373 |
| Shelldrake River 14962 | 344 |
| Shelter Bay 14963 | 345 |
| Sherwood Point 14919 | 314 |
| Sherwood Point Light 14919 | 317 |
| Sherwood Point Shoal 14919 | 314, 317 |
| Shiawassee River 14867 | 223 |
| Shoal Point 14880 | 238 |
| Short Cut Canal 14854 | 198 |
| Shot Point 14963 | 346 |
| Silver Bay Harbor 14967 | 364 |
| Silver City, Mich. 14965 | 351 |
| Silver Cliff 14966 | 363 |
| Silver Creek 14823 | 160 |
| Silver Creek 14966 | 364 |
| Simcoe, Ont. | 146 |
| Simmons Reef 14911 | 248 |
| Siskiwit Bay 14966 | 354 |
| Siskiwit Bay 14976 | 367 |
| Siskiwit River 14966 | 354 |
| Sister Bay 14909 | 316 |
| Sister Bay, Wis. 14909 | 316 |
| Sister Bluffs 14909 | 316 |
| Sister Island Shoal 14771 | 122 |
| Sister Islands 14909 | 316 |
| Sister Shoals 14909 | 316 |
| Sitgreaves Bay 14880 | 238 |
| Six Mile Point 14883 | 333 |
| Six Town Point 14811 | 129 |
| Skanee, Mich. 14964 | 347 |
| Sleeping Bay 14965 | 351 |
| Sleeping Bear Bay 14912 | 250 |
| Sleeping Bear Point 14912 | 250 |
| Sleeping Bear Shoal 14912 | 251 |
| Small-craft harbors of refuge, State of Michigan | 113 |
| Small-craft regulations, State of Michigan | 113 |
| Smith Island 14770 | 121 |

| | Page |
|---|---|
| Smoky Point 14804 | 133 |
| Snail Shell Harbor 14908 | 327 |
| Snake Island 14908 | 327 |
| Snake Island 14910 | 317 |
| Snell Lock 14761 | 118 |
| Snow Shoe Bay 14811 | 129 |
| Snye, The | 210 |
| Sodus Bay 14814 | 133 |
| Sodus Point, N.Y. 14814 | 133 |
| Sombra, Ont. 14852, 14853 | 214 |
| Sorel, Que. *1350 | 374 |
| Source diagrams | 17 |
| South Albany Point 14869 | 231 |
| South Arm 14942 | 246 |
| South Bass Island 14844, 14842 | 190 |
| South Bay 14969 | 345 |
| South Canal 14884 | 337 |
| South Channel 14852, 14853 | 206, 213 |
| South Channel 14933 | 258 |
| South Channel 14973 | 352 |
| South Charity Shoal 14802 | 128 |
| South Fork 14928, 14926 | 282 |
| South Fox Island 14912 | 250 |
| South Fox Island Shoals 14912 | 250 |
| South Government Island 14976 | 367 |
| South Graham Shoal 14881 | 237 |
| South Grand Island Bridge 14832 | 150 |
| South Haven, Mich. 14906 | 264 |
| South Hero Island 14781, 14782 | 373 |
| South Manitou Harbor 14912 | 251 |
| South Manitou Island 14912 | 251 |
| South Menomonee Canal 14924 | 299 |
| South Milwaukee, Wis. 14904 | 298 |
| South Park Shoal 14927 | 279 |
| South Passage 14844 | 190 |
| South Point 14861 | 229 |
| South Point 14913 | 246 |
| South Shoal 14844, 14842 | 190 |
| South Slip 14929 | 274 |
| South Twin Island 14973 | 354 |
| Southeast Bend 14852, 14853 | 213 |
| Sparrowhawk Point 14763 | 119 |
| Special Notice to Mariners | 376 |
| Special signals for surveying vessels | 26 |
| Spectacle Reef 14881 | 236 |
| Spencer Island 14763 | 119 |
| Spicer Bay 14773 | 123 |
| Spider Island 14909 | 314 |
| Spirit Lake 14975 | 355 |
| Split Rock River 14966 | 364 |
| Spoil areas | 20 |
| Spring Lake 14933 | 260 |
| Spring Lake, Mich. 14933 | 258 |
| Squaw Bay 14864 | 229 |
| Squaw Island 14832 | 147 |
| Squaw Island 14882 | 332 |
| Squaw Island 14911 | 249 |
| Squaw Point 14915 | 327 |
| Squaw Point 14966 | 353 |
| St. Albans Bay 14781 | 373 |
| St. Anne Island 14850 | 207 |
| St. Anne Island 14852 | 212 |
| St. Catharines *2042 | 139, 141 |
| St. Clair Cutoff Channel 14852, 14853 | 206, 212 |
| St. Clair Flats Canal 14852, 14853 | 213 |
| St. Clair Middle Ground 14852, 14853 | 214 |
| St. Clair River 14852, 14853 | 210 |
| St. Clair Shores, Mich. 14853 | 205 |
| St. Clair, Mich. 14852, 14853 | 214 |
| St. Helena Island 14881 | 329 |
| St. Helena Shoal 14881 | 329 |
| St. Ignace, Mich. 14881 | 237 |
| St. James Harbor 14911 | 249 |
| St. James, Mich. 14911 | 249 |
| St. Joseph Channel 14883 | 332 |
| St. Joseph Island, Ont. 14882, 14883 | 330 |
| St. Joseph River 14930 | 266 |
| St. Joseph, Mich. 14930 | 266 |
| St. Lawrence River | 115 |
| St. Lawrence Seaway | 107 |
| St. Lawrence Seaway Management Corporation (Canada) | 381 |
| St. Lawrence Seaway Management Corporation of Canada | 107 |
| St. Louis Bay 14975 | 355 |
| St. Louis River 14975 | 355 |
| St. Martin Bay 14881 | 237 |
| St. Martin Island 14881 | 237 |
| St. Martin Island 14909 | 316 |
| St. Martin Island Passage 14909 | 316 |
| St. Martin Island Shoals 14909 | 316 |
| St. Martin Point 14881 | 237 |
| St. Marys Falls 14884 | 330, 333 |
| St. Marys Falls Canal 14884 | 333 |
| St. Marys River 14882, 14883, 14884 | 330 |
| St. Regis, Que. 14761 | 117 |
| St. Vital Bay 14882 | 238 |
| St. Vital Island 14908 | 327 |
| St. Vital Point 14882 | 238 |
| St. Vital Point 14908 | 327 |
| Stag Island 14852, 14853 | 214 |
| Staley Point 14768 | 125 |
| Standard Abbreviations for Broadcast | 13 |
| Standard time | 113 |
| Stannard Rock 14963 | 347 |
| Starve Island 14844, 14842 | 190 |
| Starve Island Reef 14844, 14842 | 190 |
| State Park, High Cliff 14916 | 323 |
| SterlingIsland | 189 |
| Stockbridge Harbor 14916 | 323 |
| Stockton Island 14973 | 353 |
| Stokes Point, Ont. 14852, 14853 | 214 |
| Stoneport, Mich. 14869 | 231 |
| Stoney Point 14850 | 208 |
| Stonington, Mich. 14915 | 327 |
| Stony Creek 14830, 14846 | 190 |
| Stony Creek 14906 | 254 |
| Stony Island 14802 | 129 |
| Stony Island 14853, 14848 | 196 |
| Stony Lake 14906 | 254 |
| Stony Point (Suttons Point) 14913 | 248 |
| Stony Point 14781 | 374 |
| Stony Point 14802 | 129 |
| Stony Point 14822 | 160 |
| Stony Point 14830, 14846 | 189 |
| Stony Point 14908 | 327 |
| Stony Point 14966 | 363 |
| Stonycroft Point 14864 | 231 |
| Straits of Mackinac 14881 | 232 |
| Straits of Mackinac, South Channel 14881 | 233 |
| Strawberry Channel 14909 | 317 |
| Strawberry Island 14832 | 147, 149 |
| Strawberry Islands 14909 | 317 |
| Stribling Point 14883 | 330, 332 |
| Sturgeon Bay 14911 | 245 |
| Sturgeon Bay 14919 | 313, 317 |
| Sturgeon Bay Entrance Leading Light 14919 | 314 |
| Sturgeon Bay Point 14911 | 245 |
| Sturgeon Bay Ship Canal 14919 | 313 |
| Sturgeon Bay Ship Canal Light 14919 | 313 |
| Sturgeon Bay, Wis. 14919 | 313 |
| Sturgeon Point 14822, 14823 | 160 |
| Sturgeon Point 14864 | 229 |
| Sturgeon River 14908 | 327 |
| Sturgeon River 14972 | 348 |
| Suamico River 14918 | 324 |
| Submarine cables and submerged pipelines | 19 |
| Submerged pipelines | 19 |
| Sucker Point 14911 | 249 |
| Sugar Island 14844, 14842 | 191 |
| Sugar Island 14853, 14848 | 196 |
| Sugar Island 14869 | 231 |

| | Page |
|---|---|
| Sugar Island 14883 | 332 |
| Sugar Island 14883, 14884 | 330 |
| Sugar Island Cut 14853 | 196 |
| Sulfur Island 14864 | 229 |
| Summer Island 14908, 14909 | 316 |
| Summerland Group 14772 | 123 |
| Summerstown *1413 | 117 |
| Sunken Rock Island 14772 | 123 |
| Sunken Rock Shoal 14772 | 123 |
| Superior Bay 14975 | 355 |
| Superior Entry 14975 | 355 |
| Superior Shoal 14771 | 122 |
| Superior, Wis. 14975 | 355 |
| Surface ship procedures for assisting aircraft in distress | 10 |
| Surface ship procedures for assisting distressed surface vessels | 10 |
| Surveyors Reef 14885 | 238 |
| Susie Island 14967, 14968 | 365 |
| Suttons Bay 14913 | 248 |
| Suttons Bay, Mich. 14913 | 248 |
| Swallow Point 14973 | 354 |
| Swan Bay 14773 | 123 |
| Swan Creek 14830 | 190 |
| Swan Creek 14853 | 206 |
| Sweets Point 14882 | 332 |
| Sydenham River 14852 | 210 |
| Syracuse, N.Y. 14786 | 369 |
| | |
| Table Bluff 14909 | 316 |
| Taconite Harbor 14967 | 364 |
| Tacoosh River 14915 | 327 |
| Tahquamenon Bay 14962 | 344 |
| Tahquamenon River 14962 | 344 |
| Talford Creek 14852, 14853 | 215 |
| Talmadge River 14966 | 364 |
| Tawas Bay 14863 | 227 |
| Tawas City, Mich. 14863 | 227 |
| Tawas Light 14863 | 227 |
| Tawas Point 14863 | 227 |
| Tawas River 14863 | 227 |
| Temperance River 14967 | 365 |
| Texas 14803 | 130 |
| Thames River 14850 | 207 |
| The Forks 14929 | 272 |
| The Four Brothers 14783 | 372 |
| The Head 14976 | 368 |
| The Lake Fleet Islands 14773 | 122 |
| The Navy Islands 14773 | 122 |
| The Pond 14803 | 132 |
| The Punts 14774 | 122 |
| Third Brother Island 14771 | 122 |
| Thirtymile Point 14805, 14806 | 137 |
| Thompson Island 14976 | 366 |
| Thompsons Point 14783 | 372 |
| Thorofare Canal 14853, 14848 | 196 |
| Thorold 14822, *2042 | 143 |
| Thousand Island Park 14773 | 123 |
| Thousand Islands | 121 |
| Thousand Islands Bridge 14773 | 123 |
| Three Mile Bay 14811 | 129 |
| Three Mile Bay, N.Y. 14811 | 129 |
| Three Rivers, N.Y. 14786 | 369 |
| Three Sisters Islands 14764 | 121 |
| Thumb 14969 | 345 |
| Thunder Bay 14864 | 229 |
| Thunder Bay Island 14869 | 231 |
| Thunder Bay River 14864 | 230 |
| Tibbetts Point 14802 | 128 |
| Tibbetts Point Light 14768 | 125 |
| Time | 2, 113, 351, 366 |
| Time Signals | 15 |
| Time Signals, Canadian | 15 |
| Time Signals, NIST | 15 |
| Time Signals, USNO | 25 |
| Time, central standard time | 268, 351, 366 |

| | Page |
|---|---|
| Tittabawassee River 14867 | 223 |
| Tobin Harbor 14976 | 367 |
| Tobin Reef 14885, 14881 | 238 |
| Todd Harbor 14976 | 366 |
| Tofte 14967 | 365 |
| Toledo Beach 14846 | 189 |
| Toledo Harbor 14847, 14846 | 183 |
| Toledo, Ohio 14847, 14846 | 183 |
| Tonawanda Channel 14832 | 147, 150 |
| Tonawanda Creek 14832 | 150 |
| Tonawanda Harbor 14832 | 150 |
| Tonawanda Island 14832 | 149, 150 |
| Tonawanda, N.Y. 14832 | 150 |
| Torch Bay 14972 | 348, 349 |
| Torch Lake 14913 | 247 |
| Torch Lake 14972 | 349 |
| Torch Lake Canal 14972 | 349 |
| Toussaint Island 14763 | 119 |
| Toussaint River 14830, 14846 | 183 |
| Towage | 112 |
| Trail Creek 14905 | 268 |
| Traverse City, Mich. 14913 | 247 |
| Traverse Island 14964 | 349 |
| Traverse Point 14964 | 349 |
| Traverse River 14964 | 349 |
| Trenton Channel 14854 | 196 |
| Trenton, Mich. 14854 | 197 |
| Trout Bay 14969 | 345 |
| Trout Island 14911 | 250 |
| Trout Island Shoal 14911 | 250 |
| Trout Point 14969 | 345 |
| Troy Lock and Dam 14786 | 369 |
| Troy, N.Y. 14786 | 369 |
| Tucker Point 14913 | 247 |
| Turkey Island 14853, 14848 | 196 |
| Turtle Creek 14830, 14846 | 183 |
| Tuscarora Bay 14810, 14806 | 137 |
| Twin Rivers 14903 | 311 |
| Two Harbors, Minn. 14966 | 363 |
| Two Island River 14967 | 364 |
| Two Rivers, Wis. 14903 | 311 |
| | |
| U.S. Army Corps of Engineers (USACE) Emergency Numbers | 286 |
| U.S. Army Corps of Engineers (USACE) Offices | 376 |
| U.S. Army Corps of Engineers, (USACE) | 4 |
| U.S. Fishery Conservation Zone | 27 |
| U.S. Nautical Chart Numbering System | 19 |
| Under-keel clearances | 1 |
| Uniform State Waterway Marking System | 25 |
| Union Bay 14965 | 351 |
| Union Canal 14833 | 154 |
| Upper Narrows 14766 | 123 |
| USACE | 4, 376 |
| | |
| Valcour Island 14782 | 373 |
| Valentine Point 14908 | 327 |
| Van Buren Point 14823 | 161 |
| Vandeventer Bay 14974 | 352 |
| Vergennes, Vt. 14783 | 372 |
| Vermilion 14826 | 178 |
| Vermilion River 14826 | 178 |
| Vessel Arrival Inspections | 113 |
| Vessel Bridge-to-Bridge Radiotelephone Regulations | 32 |
| Vessel Movement Reporting System | 60 |
| Vessel Traffic Management | 58 |
| Vessel Traffic Management Contingency Plan (VTM) | 108 |
| Vessel Traffic Reporting System (Lake Erie to Lake Huron) | 108 |
| Vessel Traffic Service (Canadian waters) | 108 |
| Vessel Traffic Service (St. Marys River) | 108 |
| Vessel Traffic Service (St. Marys River) 14882, 14883, 14884 | 331 |
| Vessel Traffic Services | 108 |
| Vessel Watering Points | 6 |
| VHF-FM Radiotelephone | 28 |
| Vidal Shoals 14884 | 339 |
| Vienna Shoal 14911 | 248 |

| | Page |
|---|---|
| Waddington, N.Y. 14762 | 119 |
| Waiska Bay, MI 14884 | 339 |
| Wallace Island 14772 | 122 |
| Wallaceburg 14852 | 210, 212 |
| Walpole Island First Nation 14850 | 207 |
| Ward Canal 14830, 14846 | 183 |
| Washburn Harbor 14974 | 352 |
| Washington Harbor 14909 | 315 |
| Washington Harbor 14976 | 366 |
| Washington Island 14774 | 123 |
| Washington Island 14909 | 315 |
| Washington Island 14976 | 366 |
| Waterford, N.Y. 14786 | 369 |
| Waterway Improvement, Great Lakes-Hudson River | 369 |
| Waterway, Illinois | 286 |
| Waterway, Keweenaw 14972 | 348 |
| Waterway, Portage-Burns 14926 | 271 |
| Waterway, Rideau *1512, *1513 | 123 |
| Watkins Glen, N.Y. 14791 | 369 |
| Watson Reefs 14882 | 332 |
| Waugoshance Island 14911 | 245 |
| Waugoshance Point 14911 | 245 |
| Waukegan, Ill. 14904 | 294 |
| Wauswaugoning Bay 14967, 14968 | 365 |
| Wautoma Shoals 14805 | 136 |
| Waverly Shoal 14833 | 154 |
| Waverly Shoal 14909 | 315 |
| Weather, Alpena and vicinity | 230 |
| Weather, Buffalo and vicinity | 158 |
| Weather, Chicago and vicinity | 283 |
| Weather, Detroit River and vicinity | 192 |
| Weather, Duluth and vicinity | 360 |
| Weather, Green Bay and vicinity | 318 |
| Weather, Lake Erie | 146 |
| Weather, Lake Huron | 218 |
| Weather, Lake Michigan | 240 |
| Weather, Lake Ontario | 127 |
| Weather, Lake St. Clair and vicinity | 204 |
| Weather, Lake Superior | 341 |
| Weather, Milwaukee and vicinity | 303 |
| Weather, Muskegon and vicinity | 256 |
| Weather, Rochester and vicinity | 136 |
| Weather, Sault Ste. Marie and vicinity | 338 |
| Weather, The Great Lakes | 109 |
| Weather, The St. Lawrence River | 117 |
| Weather, Toledo and vicinity | 187 |
| Weaver Shoal 14762 | 118 |
| Welland 14822, *2042 | 143 |
| Welland Canal 14822, *2042 | 139 |
| Welland River 14822, *2042 | 141 |
| Welland River 14832 | 151 |
| Wellesley Island 14766 | 123 |
| West Arm 14913 | 246 |
| West Bay 14962 | 344 |
| West Channel 14973 | 353 |
| West Harbor 14844, 14842 | 182 |
| West Moran Bay 14881 | 329 |
| West Neebish Channel 14883 | 333 |
| West Ninemile Point 14803 | 132 |
| West Outer Channel 14848 | 194 |
| West Sister Island 14830 | 191 |
| West Sister Reef 14830 | 191 |
| West Twin River 14903 | 311 |
| Westminster Park, N.Y. 14772 | 123 |
| Westport, N.Y. 14783 | 372 |
| Whaleback Shoal 14770 | 121 |
| Whaleback Shoal 14909 | 326 |
| Whiskey Island 14911 | 249 |
| Whiskey Island Shoal 14772 | 122 |
| White Lake 14935 | 254 |
| White River 14935 | 254 |
| White Shoal 14911 | 248 |
| Whitefish Bay 14864 | 229 |
| Whitefish Bay 14884 | 330 |
| Whitefish Bay 14904 | 305 |
| Whitefish Bay 14910 | 314 |
| Whitefish Bay 14962 | 343 |
| Whitefish Point 14864 | 229 |
| Whitefish Point 14910 | 314 |
| Whitefish Point 14962 | 344 |
| Whitefish Point Harbor 14962 | 344 |
| Whitefish River 14915 | 327 |
| Whitehall, Mich. 14935 | 254 |
| Whitehall, N.Y. 14786 | 369 |
| Whites Bay 14811 | 129 |
| Whitestone Point 14863 | 227 |
| Whitney Bay 14882 | 238 |
| Wick Point 14969 | 345 |
| Wiggins Point 14908 | 328 |
| Wiggins Point Shoal 14908 | 328 |
| Wigwam Bay 14863 | 226 |
| Wild Fowl Bay 14863 | 223 |
| Wild Fowl Point 14863 | 223 |
| Wiley-Dondero Canal 14761 | 118 |
| Williams Island 14969 | 345 |
| Willsboro Bay 14783 | 372 |
| Willsboro Point 14783 | 372 |
| Wilmette, Ill. 14926, 14927 | 293 |
| Wilson Bay 14802 | 128 |
| Wilson Harbor 14810, 14806 | 137 |
| Wilson Hill Island 14762 | 118 |
| Wilson Point 14802 | 128 |
| Wind Point 14925 | 298 |
| Wind Point North Shoal 14904 | 298 |
| Wind Point South Shoal 14925 | 298 |
| Windmill Point Light 14853, 14848 | 201 |
| Winds | 2 |
| Windsor, Ont. 14853, 14848 | 201 |
| Winneconne, Wis. | 324 |
| Winooski River 14782 | 373 |
| Winter Navigation | 112 |
| Winthrop Harbor 14904 | 294 |
| Wisconsin Point 14975 | 355 |
| Wolf River | 324 |
| Wolfe Island 14767, 14768 | 125 |
| Wolfe Island Cut 14774 | 125 |
| Wood Creek 14786 | 369 |
| Wood Island 14969 | 345 |
| Wright Island 14976 | 367 |
| Wrights Landing Marina 14813 | 132 |
| WWV and WWVH broadcasts | 25 |
| Wyandotte, Mich. 14854 | 197 |
| Yellow Dog Point 14963 | 347 |
| York Island 14973 | 354 |
| York Island Shoals 14973 | 354 |
| Youngstown, N.Y. 14816 | 139 |
| Zela Point 14881 | 233 |
| Zela Shoal 14881 | 233 |
| Zilwaukee, Mich. 14867 | 223 |
| Zion 14904 | 294 |
| Zug Island 14854 | 198 |

OMF Approval No. 0648-0007 Expires 5/31/01

NOAA Form 77-6
(Rev. 06/98)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

# COAST PILOT REPORT

**SUBMIT TO:**

NATIONAL OCEAN SERVICE, NOAA (N/CS261)
1315 EAST-WEST HIGHWAY, STATION 7350
SILVER SPRING, MD 20910-3282
FAX: 301-713-4516
INTERNET: Lynn.Preston@noaa.gov

This record of your experience and observations when traversing the coast, entering port, and/or navigating inside waters will be used to update the Coast Pilot.

**OBSERVER: NAME AND ADDRESS**

_____
_____
_____
_____

**TEL. (daytime)** _____

**FAX** _____

**DATE OF OBSERVATION** _____

**DATE OF SUBMISSION** _____

**VESSEL NAME AND ADDRESS** _____
_____
_____
_____
_____

**GEOGRAPHIC LOCATION**

*(Refer to charted objects by distance and bearing and/or include latitude/longitude, as applicable)*

_____
_____
_____
_____
_____
_____

**CHART NUMBER**

**COAST PILOT NUMBER and EDITION NUMBER**

**CHANGES TO EXISTING COAST PILOT TEXT**

Give recommended revised language for the book. Identify affected text by page, paragraph(s), and line number(s). State the source of the information if other than personal observation.

_____
_____
_____
_____
_____
_____
_____

(Continue on plain paper)

## REQUEST FOR SURVEYS OR CHART CHANGE

List area for which surveys and/or changes in chart format, scale, or layout are needed. Include the name and geographic position of the area, the chart number of the largest scale chart that covers the area, and the reason for the request.

(Continue on plain paper)

## ADDITIONAL INFORMATION FOR THE COAST PILOT

We are particularly interested in information about unusually strong currents; prominent landmarks; objects which provide particularly good radar return; sheltered anchorages (be explicit on direction of weather and type of bottom observed); drawbridge operation changes (e.g., drawbridge remains permanently in open position); changes in pilot pick-up points; changes in radio frequencies monitored by pilots, marine exchanges, harbor masters, or drawbridges.

(Continue on plain paper)

This information is required as part of NOAA's function to maintain marine nautical charts. The information obtained will be used to update the Coast Pilot. Your response is voluntary and will be a matter of public record. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the National Ocean Service (N/CS26), 1315 East-West Highway, Silver Spring, MD 20910-3282. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

OMF Approval No. 0648-0007 Expires 5/31/01

NOAA Form 77-6
(Rev. 06/98)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

# COAST PILOT REPORT

**SUBMIT TO:**

NATIONAL OCEAN SERVICE, NOAA (N/CS261)
1315 EAST-WEST HIGHWAY, STATION 7350
SILVER SPRING, MD 20910-3282
FAX: 301-713-4516
INTERNET: Lynn.Preston@noaa.gov

This record of your experience and observations when traversing the coast, entering port, and/or navigating inside waters will be used to update the Coast Pilot.

**OBSERVER: NAME AND ADDRESS**

_____
_____
_____
_____

**TEL. (daytime)** _____

**FAX** _____

**DATE OF OBSERVATION** _____

**DATE OF SUBMISSION** _____

**VESSEL NAME AND ADDRESS** _____
_____
_____
_____
_____

**GEOGRAPHIC LOCATION**

*(Refer to charted objects by distance and bearing and/or include latitude/longitude, as applicable)*

_____
_____
_____
_____
_____
_____

| **CHART NUMBER** | **COAST PILOT NUMBER and EDITION NUMBER** |
|---|---|
| | |

**CHANGES TO EXISTING COAST PILOT TEXT**

Give recommended revised language for the book. Identify affected text by page, paragraph(s), and line number(s). State the source of the information if other than personal observation.

_____
_____
_____
_____
_____
_____
_____

(Continue on plain paper)

## REQUEST FOR SURVEYS OR CHART CHANGE

List area for which surveys and/or changes in chart format, scale, or layout are needed. Include the name and geographic position of the area, the chart number of the largest scale chart that covers the area, and the reason for the request.

(Continue on plain paper)

## ADDITIONAL INFORMATION FOR THE COAST PILOT

We are particularly interested in information about unusually strong currents; prominent landmarks; objects which provide particularly good radar return; sheltered anchorages (be explicit on direction of weather and type of bottom observed); drawbridge operation changes (e.g., drawbridge remains permanently in open position); changes in pilot pick-up points; changes in radio frequencies monitored by pilots, marine exchanges, harbor masters, or drawbridges.

(Continue on plain paper)

This information is required as part of NOAA's function to maintain marine nautical charts. The information obtained will be used to update the Coast Pilot. Your response is voluntary and will be a matter of public record. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the National Ocean Service (N/CS26), 1315 East-West Highway, Silver Spring, MD 20910-3282. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

OMF Approval No. 0648-0007 Expires 5/31/01

NOAA Form 77-6
(Rev. 06/98)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

# COAST PILOT REPORT

**SUBMIT TO:**

NATIONAL OCEAN SERVICE, NOAA (N/CS261)
1315 EAST-WEST HIGHWAY, STATION 7350
SILVER SPRING, MD 20910-3282
FAX: 301-713-4516
INTERNET: Lynn.Preston@noaa.gov

This record of your experience and observations when traversing the coast, entering port, and/or navigating inside waters will be used to update the Coast Pilot.

**OBSERVER: NAME AND ADDRESS**

_____

_____

_____

_____

**TEL. (daytime)** _____

**FAX** _____

**DATE OF OBSERVATION** _____

**DATE OF SUBMISSION** _____

**VESSEL NAME AND ADDRESS** _____

_____

_____

_____

_____

**GEOGRAPHIC LOCATION**

*(Refer to charted objects by distance and bearing and/or include latitude/longitude, as applicable)*

_____

_____

_____

_____

_____

_____

| CHART NUMBER | COAST PILOT NUMBER and EDITION NUMBER |
|---|---|
| | |

**CHANGES TO EXISTING COAST PILOT TEXT**

Give recommended revised language for the book. Identify affected text by page, paragraph(s), and line number(s). State the source of the information if other than personal observation.

_____

_____

_____

_____

_____

_____

_____

(Continue on plain paper)

## REQUEST FOR SURVEYS OR CHART CHANGE

List area for which surveys and/or changes in chart format, scale, or layout are needed. Include the name and geographic position of the area, the chart number of the largest scale chart that covers the area, and the reason for the request.

(Continue on plain paper)

## ADDITIONAL INFORMATION FOR THE COAST PILOT

We are particularly interested in information about unusually strong currents; prominent landmarks; objects which provide particularly good radar return; sheltered anchorages (be explicit on direction of weather and type of bottom observed); drawbridge operation changes (e.g., drawbridge remains permanently in open position); changes in pilot pick-up points; changes in radio frequencies monitored by pilots, marine exchanges, harbor masters, or drawbridges.

(Continue on plain paper)

This information is required as part of NOAA's function to maintain marine nautical charts. The information obtained will be used to update the Coast Pilot. Your response is voluntary and will be a matter of public record. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the National Ocean Service (N/CS26), 1315 East-West Highway, Silver Spring, MD 20910-3282. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.