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United States Coast Pilot 3

Atlantic Coast: Sandy Hook to Cape Henry

1988 (26th) Edition

Includes:
All amendments to the previous edition issued in Notices to Mariners are incorporated in this edition.

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LIMITS OF UNITED STATES COAST PILOTS

Atlantic Coast

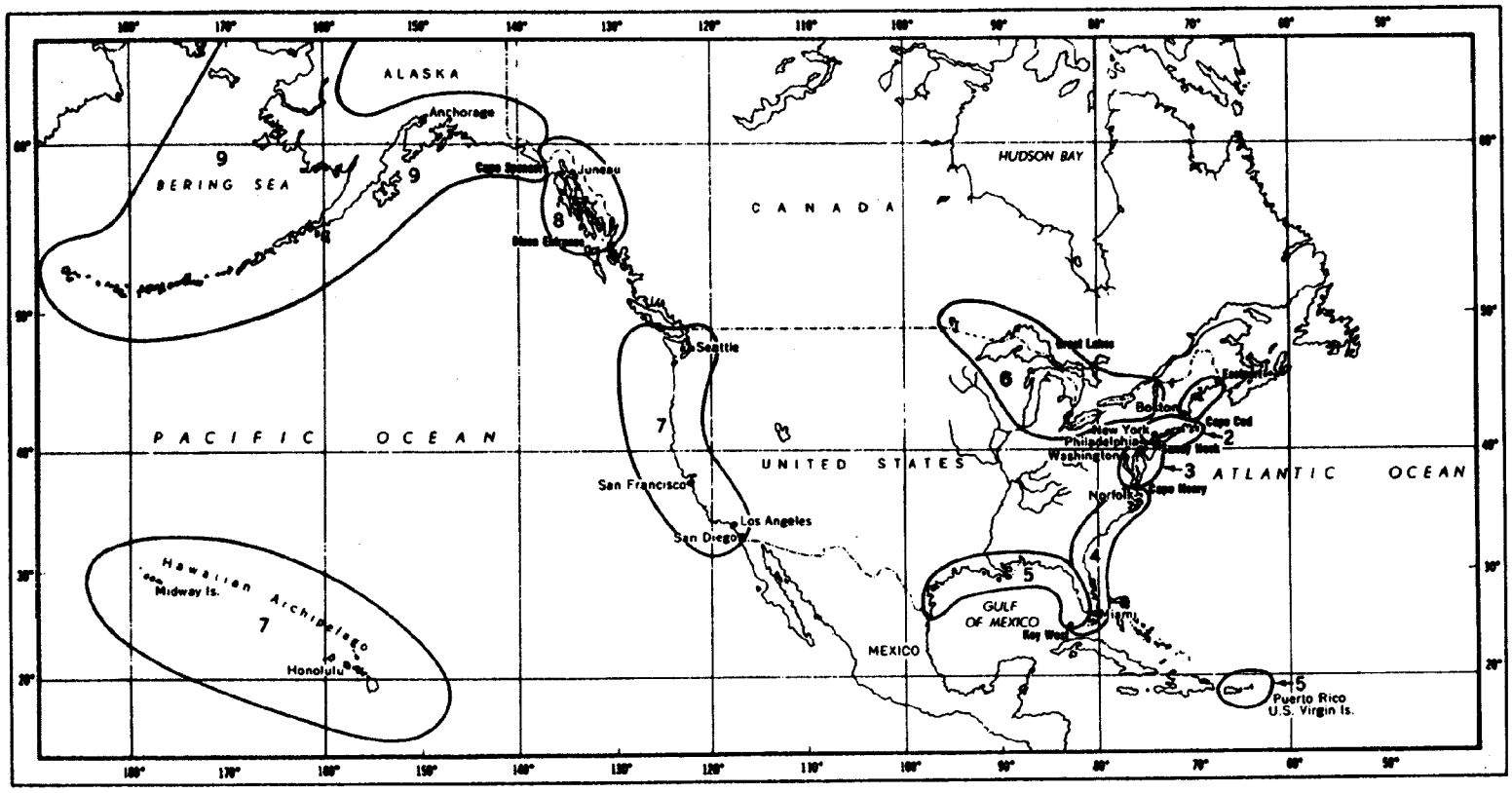
1 Eastport to Cape Cod
2 Cape Cod to Sandy Hook
3 Sandy Hook to Cape Henry
4 Cape Henry to Key West
5 Gulf of Mexico, Puerto Rico, and Virgin Islands

Pacific Coast

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

Great Lakes

6 The Lakes and their Connecting Waterways



Preface

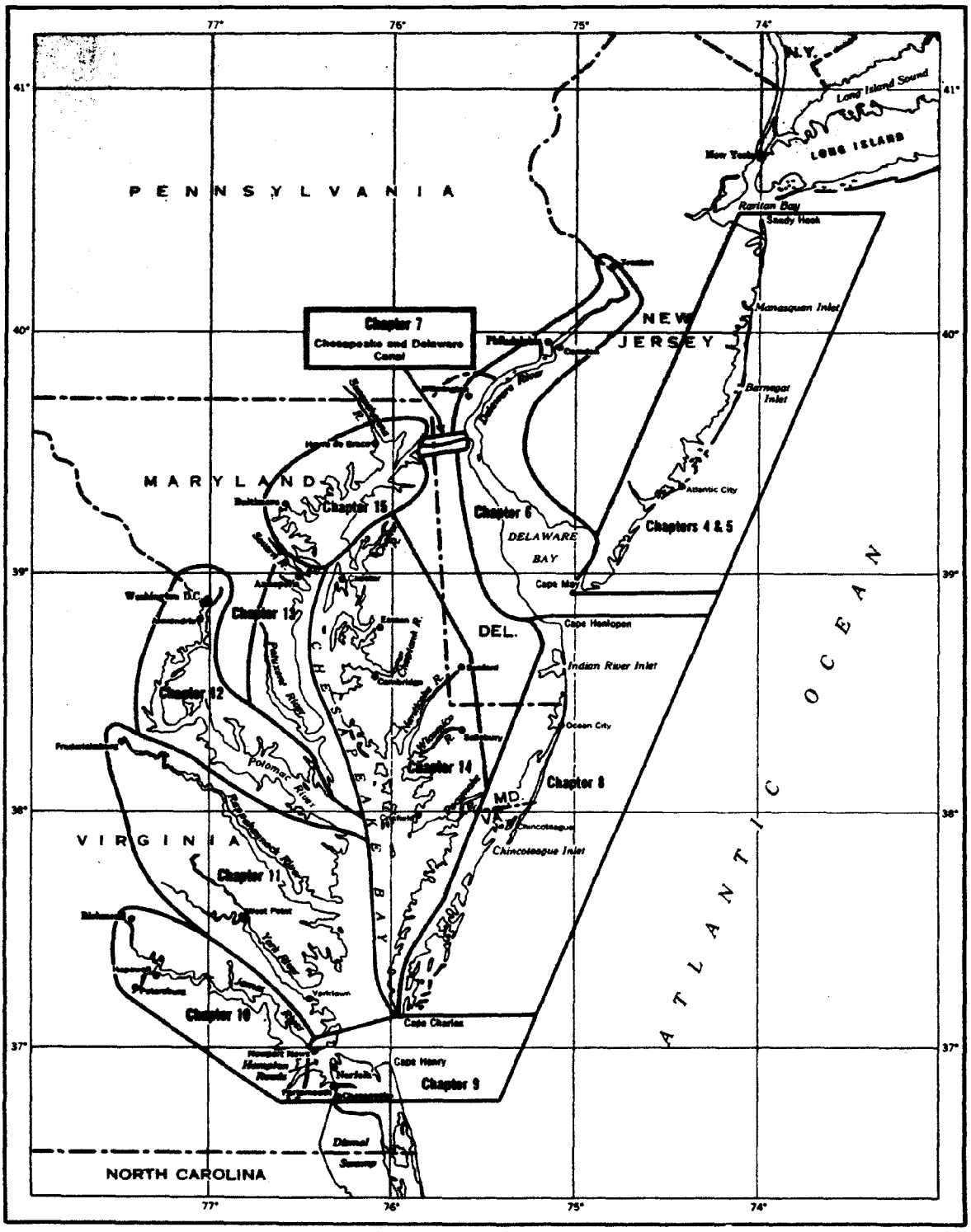
The United States Coast Pilot is published by the National Ocean Service (NOS), Charting and Geodetic Services (C&GS), National Oceanic and Atmospheric Administration (NOAA), pursuant to the Act of 6 August 1947 (33 U.S.C. 883a and b), and the Act of 22 October 1968 (44 U.S.C. 1310).

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 3, Atlantic Coast, Sandy Hook to Cape Henry, cancels the 1987 (25th) 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 appendix for address. All amendments are also issued in Defense Mapping Agency Notices to Mariners.

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 Defense Mapping Agency Hydrographic/Topographic Center Notice to Mariners for your convenience. These reports and/or suggestions for increasing the usefulness of the Coast Pilot should be sent to Director, Charting and Geodetic Services, (N/CG223), National Ocean Service, NOAA, Rockville, MD 20852-3806.



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1. GENERAL INFORMATION

UNITED STATES COAST PILOT.–The National Ocean Service Coast Pilot is a series of nine nautical books that cover 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.

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 Defense Mapping Agency Notices to Mariners.

Bearings.–These are true, and when given in degrees are clockwise from 000° (north) to 359°. Light-sector bearings are toward the light.

Bridges and cables. –Vertical clearances of bridges and overhead cables are in feet above mean high water unless otherwise stated; 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.) Submarine cables are rarely mentioned.

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.**

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.

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

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 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.

In general, the Coast Pilot gives the project depths for deep-draft ship channels maintained by the 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.**

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 tide levels, and depths recorded by echo sounders.

It cannot be too strongly emphasized that even charts based on modern surveys may not show all sea-bed obstructions or the shoalest depths, and actual tide levels may be appreciably lower than those predicted.

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 apart should construct a table of true and recorded depths using the Traverse Tables. (Refer to discussion of echo soundings elsewhere in chapter 1.)

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.

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.

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. **Caution and common sense are continuing requirements for safe navigation.**

Distances.–These are in nautical miles unless otherwise

stated. A nautical mile is 1 minute of latitude, or approximately 2,000 yards, and is about 1.15 statute miles.

Heights.–These are in feet above the tidal datum used for that purpose on the charts, usually mean high water. However, the heights of the decks of piers and wharves are given in feet above the chart datum for depths.

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

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

Radio aids to navigation.–These are seldom described. (See Coast Guard Light Lists and Defense Mapping Agency Hydrographic/Topographic Center Radio Navigational Aids publication.)

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

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 the Coast Pilot; such **unverified information** is qualified as "reported", and should be regarded with caution.

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.)

Winds.–Directions are the true directions from which the winds blow. Unless otherwise indicated, speeds are given in knots, which are nautical miles per hour.

NOTICES TO MARINERS

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.

Local Notice to Mariners is issued by each Coast Guard District Commander for the waters under his jurisdiction. (See appendix for Coast Guard district(s) covered by this volume.) These notices are usually published weekly and may be obtained without cost by making application to the appropriate District Commander.

Notice to Mariners, published weekly by the Defense Mapping Agency Hydrographic/Topographic Center, 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 oceangoing 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 1. These items are important to the mariner and should be read for future reference. These notices may be obtained by operators of oceangoing vessels, without cost, by making application to **Defense Mapping Agency** (see Defense Mapping Agency Procurement Information in appendix).

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 National Ocean Survey 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.

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 Navigation Warnings and Weather, this chapter.)

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 oceangoing vessels will require the Local Notices to Mariners to keep charts and related publications up-to-date. Information for oceangoing vessels can be obtained from the Notice to Mariners published by the Defense Mapping Agency Hydrographic/Topographic Center.

Notices to Mariners may be consulted at Coast Guard district offices, NOS field offices, Defense Mapping Agency Hydrographic/Topographic Center offices and depots, most local marine facilities, and sales agents handling charts and related publications.

U.S. GOVERNMENT AGENCIES PROVIDING MARITIME SERVICES

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 movement 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.

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.)

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% 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.

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.

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 Rockville, 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.)

Sales agents for Charts, the Coast Pilot, Tide Tables, Tidal Current Tables, Tidal Current Diagrams, and Tidal Current Charts 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 Branch (N/CG33). (See appendix for address.)

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.

Tide Tables are issued annually by NOS in advance of the year for which they are prepared. These tables include predicted times and heights of high and low waters for every day in the year for a number of reference stations and differences for obtaining similar predictions for numerous other places. They also include other useful information such as a method of obtaining heights of tide at any time, local mean time of sunrise and sunset for various latitudes, reduction of local mean time to standard time, and time of moonrise and moonset for various ports.

Caution.–In using the Tide Tables, slack water should not be confused with high or low water. For ocean stations there is usually little difference between the time of high or low water and the beginning of ebb or flood currents; but for places in narrow channels, landlocked harbors, or on tidal rivers, the time of slack current may differ by several hours from the time of high or low water. The relation of the times of high or low water to the turning of the current depends upon a number of factors, so that no simple general rule can be given. (To obtain the times of slack water, refer to the Tidal Current Tables.)

Tidal Current Tables for the coasts of the United States are issued annually by NOS in advance of the year for which they are prepared. These tables include daily predictions of the times of slack water and the times and velocities of strength of flood and ebb currents for a number of waterways, together with differences for obtaining predictions for numerous other places. Also included is other useful information such as a method for obtaining the velocity of current at any time, duration of slack, coastal tidal currents, wind currents, combination of currents, and current diagrams. Some information on the Gulf Stream is included in the tables for the Atlantic coast.

Tidal Current Charts are published by NOS for various localities. These charts depict the direction and velocity of the current for each hour of the tidal cycle. They present a comprehensive view of the tidal current movement in the respective waterways as a whole and when used with the proper current tables or tide tables supply a means for readily determining for any time the direction and velocity of the current at various localities throughout the areas covered.

Tidal Current Diagrams, published annually by NOS, are a series of 12 monthly computer constructed diagrams used in conjunction with the Tidal Current Charts for a particular area. The diagrams present an alternate but more simplified method for calculating the speed and direction of the tidal currents in bays, estuaries, and harbors.

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 United States 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. navigational 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.

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.

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 Commander, Atlantic Area (As), U.S. Coast Guard, AMVER Center, Governors Island, New York, N.Y. 10004. Although AMVER reports may be sent through nonparticipating stations, the Coast Guard cannot reimburse the sender for any charges applied.

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.

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.

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.

Instructions guiding participation in the AMVER System are available in the following languages: Chinese, Danish, Dutch, English, French, German, Greek, Italian, Japanese, Korean, Polish, Norwegian, Portuguese, Russian, Spanish, and Swedish. The AMVER Users Manual is available from: Commander, Atlantic Area U.S. Coast Guard, Governors Island, NY, 10004-5000; Commander, Pacific Area, U.S. Coast Guard, Coast Guard Island, Alameda, CA 94501-5100; 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.

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 **160.201**, chapter 2, for rules and regulations.)

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.

Details of the above procedures are contained in the AMVER Users Manual. The system is also published in DMAHTC Pub. 117.

Search and Rescue Operations 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.

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.)

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.

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.)

Corps of Engineers, 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.

Information concerning the various ports, improvements, channel depths, navigable waters, 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.)

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.

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".

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.)

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.

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.)

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.)

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.

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.

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.

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.

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.

Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC), Department of Defense.–The Defense Mapping Agency Hydrographic/Topographic Center 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 Defense Mapping Agency Procurement Information in appendix.)

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

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.

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.

"Ill person" means person who:

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

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.

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.

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, Atlan-

ta, Ga. 30333. (See appendix for addresses of U.S. Public Health Service Quarantine Stations.)

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.

Vessel Watering Points.–FDA annually publishes a list of **Acceptable Vessel Watering Points**. This list is available from most FDA offices or from the Interstate Travel Sanitation Subprogram Center for Food Safety and Applied Nutrition, FDA (HFF-312), 200 C Street SW., Washington, D.C. 20204. Since the acceptability of watering points may have changed since January 1, their current status must be obtained by contacting any FDA office. (See appendix for addresses.)

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.)

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.

The principal means of disseminating marine weather services and products in 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. These broadcasts repeat taped messages every 4-6 minutes. Tapes are updated periodically, usually every 2-3 hours and amended as required to include the latest information. When severe weather threatens, routine transmissions are interrupted and the broadcast is devoted to emergency warnings. (See appendix for NOAA Weather Radio Stations covered by this Coast Pilot.)

In coastal areas, the programming is tailored to the needs of the marine community. Each coastal marine forecast covers a specific area. For example, "Cape Henlopen to Virginia Beach, out 20 miles." The broadcast range is about 40 miles from the transmitting antenna site, depending on terrain and quality of the receiver used. When transmitting antennas are on high ground, the range is somewhat greater, reaching 60 miles or more. Some receivers are equipped with a warning alert device that can be turned on by means of a tone signal controlled by the NWS office concerned. This signal is transmitted for 13 seconds preceding an announcement of a severe weather warning.

Marine weather warnings are displayed to small-craft operators and others within sight of the shore by the flags, pennants, and lights of the **Coastal Warning Display** program. This means of receiving marine warnings is the least efficient because of the limited visual range of the display and problems in hoisting and lowering the display promptly. The Coastal Warning Display program is being de-emphasized as small-boat operators and coastal residents are urged to rely instead on low-cost, portable NOAA Weather Radio receivers.

NWS marine weather products are also disseminated to marine users through the broadcast facilities of the Coast Guard, Navy, National Bureau of Standards, National Marine Fisheries Service, certain Sea Grant Universities, 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, Coastal Warning Display sites, telephone numbers of recorded weather messages and NWS offices, and other useful marine weather information.

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.

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.)

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 non-realtime meteorological and oceanographic data collected by government agencies and private institutions. Marine weather observations are col-

lected from ships at sea on a voluntary basis. About 1 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 Defense Mapping Agency Hydrographic/Topographic Center's **Pilot Charts** and **Sailing Directions Planning Guides.**

DISTRESS SIGNALS AND COMMUNICATION PROCEDURES

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.

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

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

(3) The International Flag Code Signal of NC.

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

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

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

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

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

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

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

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

(12) The radiotelegraph alarm signal.

(13) The radiotelephone alarm signal.

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

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

(16) A dye marker.

Radio distress procedures.–Distress calls are made on 500 kHz (SOS) for radiotelegraphy and on 2182 kHz or channel 16 VHF-FM (MAYDAY) for radiotelephony. For less serious situations than warrant the distress procedure, the urgency signal PAN (PAHN, spoken three times), or the safety signal SECURITY (SAY-CURITAY, spoken three times), for radiotelephony, are used as appropriate. Since radiotelegraph transmissions are normally made by professional operators, and urgency and safety situations are less critical, only the distress procedures for voice radiotelephone are described. For complete information on emergency radio procedures, see **47 CFR 83** or DMAHTC Pub. 117. **(See appendix for a list of Coast Guard Stations which guard 2182 kHz and channel 16.)** Complete information on distress guards can be obtained from Coast Guard District Commanders.

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.

Radiotelephone distress communications include the following actions:

(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.

(2) The **distress call,** consisting of:–the distress signal MAYDAY (spoken three times);

the words THIS IS (spoken once);

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

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

the distress signal MAYDAY;

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);

the nature of the distress;

the kind of assistance desired;

the number of persons aboard and the condition of any injured;

present seaworthiness of vessel;

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

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

your listening frequency and schedule;

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

(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:

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

the words THIS IS;

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

The words RECEIVED MAYDAY.

After the above acknowledgement, allow a momentary interval of listening to insure 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:

the word MAYDAY;

the call sign and name of distressed vessel;

the words THIS IS;

the call sign and name of your vessel;

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

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

(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.

(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:

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

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

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

In these cases, the transmission shall consist of:

the radiotelephone alarm signal (if available);

the words MAYDAY RELAY (spoken three times);

the words THIS IS;

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

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.

(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:

the distress signal MAYDAY;

the call TO ALL STATIONS, spoken three times;

the words THIS IS;

the call sign and name of the station sending the message;

the time;

the name and call sign of the vessel in distress;

the words SEELONCE FEENEE (French for silence finished).

DISTRESS ASSISTANCE AND COORDINATION PROCEDURES

Surface ship procedures for assisting distressed surface vessels.

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

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

(b) Immediately try to take D/F bearings during the transmission of the distress message and maintain a D/F watch on 500 kHz and/or 2182 kHz;

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

(i) identity;

(ii) position;

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

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

(d) Maintain a continuous listening watch on the frequency used for the distress. This will normally be:

(i) 500 kHz (radiotelegraphy) and/or

(ii) 2182 kHz (radiotelephony).

(e) Additionally, maintain watch on VHF-FM channel 16 (156.80 MHz) as necessary;

(f) Operate radar continuously;

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

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

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

(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.

(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.

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

(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;

(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;

(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;

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

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

(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;

(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.

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,

(a) Circling the surface craft at least once.

(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.

(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.

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

(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.

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.

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 enroute frequency in use at the time between the aircraft and aeronautical station. The aircraft may change to another frequency, possibly another enroute 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.

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 frequencies of 500 kHz and 2182 kHz. Ships may, however, become aware of the casualty by receiving:

(a) An SOS message from an aircraft in distress which is able to transmit on 500 kHz or a distress signal from an aircraft using radiotelephone on 2182 kHz.

(b) A radiotelegraphy distress signal on 500 kHz from a hand-operated emergency transmitter carried by some aircraft.

(c) A message from a SAR aircraft.

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.

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.

5. Aircraft usually sink quickly (e.g. 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.

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.

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

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

(b) By day, make black smoke.

(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.

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:

(a) Wind direction and force.

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

(c) Other pertinent weather information.

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.

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.

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

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.

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.

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

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

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

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

(e) How many ditched with the aircraft?

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

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

(h) What flotation gear had they?

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

(j) What caused the emergency?

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, 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.

When requesting helicopter assistance:

(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.

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

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

(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.

Preparations prior to the arrival of the helicopter:

(1) Provide continuous radio guard on 2182 kHz or specified voice frequency, if possible. The helicopter normally cannot operate CW.

(2) Select and clear the most suitable hoist area, preferably aft on the vessel with a minimum of 50 feet 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.

(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.

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

(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.

(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.

Hoist operations:

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

(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).

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

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

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

(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.

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

(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.

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

(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.

(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.

(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 trail line to the vessel or attempt to move stretcher without unhooking.**

(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.

(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.

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 the master:

Vessel's name and call sign.
Vessel's position and time at position.
Vessel's course, speed and next port and estimated time of arrival (ETA).
Patient's name, nationality, age, race and sex.
Patient's respiration, pulse and temperature.
Patient's symptoms and nature of illness.
Any known history of similar illness.
Location and type of pain.
Medical supplies carried on board vessel.
Medication given to patient.
Weather.
Communication schedule and frequency.

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.

Preparations for being towed by Coast Guard:

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

(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.

(3) Have material ready for chafing gear.

Radar reflectors on small craft. Operators of disabled wooden 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 metallic object that would assist their detection by radar. Coast Guard cutters and aircraft are radar equipped and thus are able to continue searching in darkness and during other periods of low visibility. It is advisable for coastal fishing boats, yachts, and other small craft to have efficient radar reflectors permanently installed aboard the vessel.

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.

Medical advice.–Free medical advice is furnished to seamen by radio through the cooperation of Governmental and commercial radio stations whose operators receive and relay messages **DH MEDICO** from ships at sea to the U.S. Coast Guard and/or directly to a hospital and then radio the medical advice back to the ships. (See appendix for list of radio stations that provide this service.)

RADIO NAVIGATION WARNINGS AND WEATHER

Marine radio warnings and weather forecasts are disseminated by many sources and through several types of transmissions. Only voice radiotelephone broadcasts are described in the Coast Pilot. Radiotelegraph (CW), radioteletype, radiofacsimile, and CW broadcasts of navigational warnings and other advisories are not described, since these transmissions are normally copied only by professional radio operators. (For complete information on radio warnings and weather, see DMAHTC Pub. 117 and the joint National Weather Service/Navy publication Selected Worldwide Marine Weather Broadcasts.)

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 Pilot in kilocycles (kc) and megacycles (mc) are now stated in **kilohertz (kHz)** and **Megahertz (MHz),** respectively.

Coast Guard radio stations.–Coast Guard radio stations provide urgent, safety, and scheduled marine information broadcasts with virtually complete coverage of the approaches and coastal waters of the United States, Puerto Rico, and the U.S. Virgin Islands.

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

Urgent and safety radiotelephone broadcasts of important Notice to Mariners items, storm warnings, and other vital marine information are transmitted upon receipt, and urgent broadcasts are repeated 15 minutes later; additional broadcasts are made at the discretion of the originator. **Urgent** broadcasts are preceded by the urgent signal PAN (PAHN, spoken three times). **Both the urgent signal and message are transmitted on 2182 kHz and/or VHF-FM channel 16. Safety** broadcasts are preceded by the safety signal SECURITY (SAY-CURITAY, spoken three times). **The safety signal is given on 2182 kHz and/or VHF-FM channel 16, and the message is given on 2670 kHz and/or VHF-FM channel 22A.**

NAVTEX Marine Information Broadcasts.–NAVTEX, an internationally standard method of broadcasting notices to mariners and marine weather forecasts using small, low-cost ($700-$1,800) printing receivers designed to be installed in the pilot house of a vessel, began operations in the Boston, Massachusetts area October 1983. NAVTEX receivers screen incoming messages, inhibiting those which have been previously received or are of a category of no interest to the user, and print the rest on adding machine-sized paper. NAVTEX will not only provide critical marine information previously available only to those knowledgeable in Morse code, but also will allow any mariner who cannot man a radio full time to receive immediately safety information at any hour. All NAVTEX transmissions are made on 518 kHz. Mariners who do not have NAVTEX receivers but have radio telex (SITOR) radio equipment can also receive these broadcasts by operating it in the forward error correcting (FEC) mode and tuning to 518 kHz.

First and Third Coast Guard District Broadcast Notices to Mariners, International Ice Patrol reports, offshore marine weather forecasts and warnings (which include New England continental shelf and slope waters west of 60°W to 1,000 fathoms, Gulf of Maine, Georges Bank, south of New England and south of Nova Scotia forecasts), and distress, urgent and safety messages are broadcast from Boston daily at 0500, 1100, 1700, and 2300 GMT. NAVTEX station identification code is F (Foxtrot), its 50 uV/m service radius is 250 nautical miles.

In December 1985, the Coast Guard began broadcasting marine information for the Gulf of Mexico area using 5 kilowatt NAVTEX on a trial operational basis. Broadcasts include the Eighth Coast Guard District Notices to Mariners, offshore marine weather forecasts (including Gulf of Mexico, northwestern gulf north of 25°N and west of 90°W, southwestern gulf south of 25°N and west of 90°W, middle of gulf between 85°W and 90°W, eastern gulf between 81°W and 85°W), marine weather warnings, and distress, urgent and safety messages. Notices to Mariners and weather forecasts are broadcast at 0000, 0600, 1200, and 1800 GMT, and weather warnings and distress, urgent and safety messages are broadcast upon receipt. NAVTEX station identification is G (Golf) and service radius is about 550 nautical miles.

In May 1987, the Coast Pilot began broadcasting marine information from Miami, FL, (station NMA) using 800 watt NAVTEX on a trial operational basis. Broadcasts include Seventh Coast Guard District Local Notices to Mariners; offshore marine weather (WX) forecasts, including Jupiter Inlet to Key Largo out to Bahama Banks, Key Largo to Dry Tortugas including Straits of Florida and Florida Bay, and Southwest Atlantic; Gulf Stream location; marine weather warnings; distress, urgent, and safety messages. Notices to Mariners and weather forecasts are broadcast at 0240, 0800, 1350, and 2000 GMT, and weather warnings, and distress, urgent, and safety messages are broadcast upon receipt. NAVTEX station identifier is A (Alpha) and service radius from Miami is approximately 400 nautical miles.

The Coast Guard expects to have NAVTEX operating from Portsmouth, VA, by the end of 1987. Plans exist to have a national NAVTEX system with service about 400 miles off the United States east, west, and gulf coasts, including Puerto Rico, Alaska, Hawaii, and Guam, by 1990.

Broadcasts are planned internationally (already operational in Northern Europe), and mandatory carriage of NAVTEX receivers is planned for all International Maritime Organization (IMO) regulated vessels after 1990.

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

Commandant (G-TTS-3/64)
United States Coast Guard
Washington, DC 20593
Telex: 89-2427 COMDT COGARD Washington, DC.

NOAA Weather Radio.–The National Weather Service

operates **VHF-FM radio stations,** usually on frequencies **162.40, 162.475, or 162.55 MHz,** to provide continuous recorded weather broadcasts. These broadcasts are available to those with suitable receivers within about 40 miles of the antenna site. (See the appendix for a list of these stations in the area covered by this Coast Pilot.)

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, from Selected Worldwide Marine Weather Broadcasts, or from the series of Marine Weather Services Charts published by NWS.

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. These stations are listed on the series of Marine Weather Services Charts published by NWS.

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.

During the West Indies hurricane season, June 1 to November 30, ships in the Gulf of Mexico, Caribbean Sea area, southern North Atlantic Ocean, and the Pacific waters west of Central America and Mexico are urged to cooperate with NWS in furnishing these special reports in order that warnings to shipping and coastal areas may be issued.

Time Signals.–The **National Bureau of Standards** 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, Omega Navigation System status reports, geophysical alerts, BCD (binary coded decimal) time code, UT1 time corrections, and high seas storm information.

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.

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

NAUTICAL CHARTS

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 Director, Charting and Geodetic Services, Attention: N/CG22, National Ocean Service, NOAA, Rockville, MD 20852-3806.

Chart symbols and abbreviations.–The standard symbols and abbreviations approved for use on all regular nautical charts published by the Defense Mapping Agency Hydrographic/Topographic Center and NOS are contained in **Chart No. 1,** United States of America **Nautical Chart Symbols and Abbreviations.** This publication is available from the Defense Mapping Agency Office of Distribution Services and NOS, and their sales agents.

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

Chart Datum.–Chart Datum is the particular tidal datum to which soundings and depth curves on a nautical chart or bathymetric map are referred. The tidal datum of **Mean Low Water** has been used as Chart Datum along the east coast of the United States and in parts of the West Indies. It is presently being changed to Mean Lower Low Water, with no adjustments to soundings, shorelines, low water lines, clearances, heights, elevations, or in the application of tide predictions for navigational purposes. The tidal datum of **Mean Lower Low Water** is used as Chart Datum along the gulf and west coasts; the coasts of Alaska, Hawaii, and other United States and United Nations islands of the Pacific; and in parts of the West Indies.

Mean Low Water is defined as the arithmetic mean of all the low water heights observed over the National Tidal Datum Epoch. Mean Lower Low Water is defined as the arithmetic mean of the lower low water height of each tidal day (24.84 hours) observed over the National Tidal Datum Epoch. The National Tidal Datum Epoch is the specific 19-year period adopted by the National Ocean Service, NOAA, as the official time segment over which tide observations are taken and reduced to obtain mean values for tidal datums. The present Epoch is 1960 through 1978.

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.

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 sea bottom at the time of sampling. Areas where sand and mud prevail, especially the entrances and approaches to bays and rivers exposed to strong tidal current and heavy seas, are subject to continual change.

In coral regions and 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, coral heads, or boulders.

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

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. A quarterly list of the latest editions is distributed to sales agents; free copies may be obtained from the sales agents or by writing to Distribution Branch (N/CG33), National Ocean Service. (See appendix for address.)

U.S. Nautical Chart Numbering System.–This chart numbering system, adopted by the National Ocean Service and the Defense Mapping Agency Hydrographic/Topographic Center, provides for a uniform method of identifying charts published by both agencies. Nautical charts published by the Defense Mapping Agency Hydrographic/Topographic Center are identified in the Coast Pilot by an asterisk preceding the chart number.

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.

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.

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:

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.

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

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.

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

Special charts, various scales, cover the Intracoastal waterways and miscellaneous small-craft areas.

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.

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.

The charted clearances of overhead cables are for the lowest wires at mean high water unless otherwise stated. **Vessels with masts, stacks, booms, or antennas should allow sufficient clearance under power cables to avoid arcing.**

Submarine cables and pipelines cross many waterways used by both large and small vessels, but all of them may not be charted. For inshore areas, they usually are buried beneath the seabed, but, for offshore areas, they may lie on the ocean floor. Warning signs are often posted to warn mariners of their existence.

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 symbols for submarine cable and pipeline routes may be shown for offshore areas. Submarine cables and pipelines are not described in the Coast Pilot.

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.

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.

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.

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.

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.)

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.

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.**

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.

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 navigation. Navigators should be cautious about passing over fish havens or anchoring in their vicinity.

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.

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 on the deep sea. 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.

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.

The **Mercator projection** used on most nautical charts 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.

Echo soundings.–Ship's 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 soundings 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.

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

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.

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. If the radio call sign of the nearest U.S. Government radio shore station is not known, radiotelegraph communication may be established by the use of the general call "NCG" on the frequency of 500 kHz. 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.

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 10 miles) expressed in nautical 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:

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.

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.

Brilliant shore lights used for advertising and other

purposes, particularly those in densely populated areas, make it difficult to identify a navigational light.

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

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.

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.

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

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.

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.

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 or obscuration of the light occurs.

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.

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.

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.

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.

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

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.

Bridge lights are fixed red or green, and are privately maintained; they are generally not charted or described in the text of the Coast Pilot. 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.

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.

Bridges and their lighting, construction, maintenance, and operation are set forth in **33 CFR 114-118** (not carried in this Coast Pilot). Aircraft obstruction lights, prescribed by the Federal Aviation Administration, may operate at certain bridges. Drawbridge operation regulations are published in chapter 2 of the Coast Pilot.

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

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.

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.

Avoidance of collision with lightships, ocean station vessels, 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.

Experience shows that lightships and 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 lightships, ocean station vessels, 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.

It should be borne in mind that most lightships and 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.

During extremely heavy weather and due to their exposed

locations, lightships may be carried off station without the knowledge and despite the best efforts of their crews. The mariner should, therefore, not implicitly rely on a lightship maintaining its precisely charted position during and immediately following severe storms. A lightship known to be off station will secure her light, fog signal, and radiobeacon and fly the International Code signal "LO" signifying "I am not in my correct position".

Watch (station) buoys are sometimes moored near lightships and seacoast buoys to mark the approximate station should these important aids be carried away or temporarily removed. The lightship watch buoy also gives the crew an indication of dragging.

Since these uncharted buoys are always unlighted and, in some cases, moored as much as 1 mile from the lightship or seacoast buoy, the danger of a closely passing vessel colliding with them is always present–particularly so during darkness or periods of reduced visibility.

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.

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 sea conditions, the slope of and the material making up the seabed, 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.

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.

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 seaward 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 vicinty of such buoys.

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.

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.

Temporary changes in aids are not included on the charts.

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.

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.

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.

Radio bearings obtained at twilight or at night, and bearings which are almost parallel to the coast, should be accepted with reservations, due to "night effect" and to the distortion of radio waves which travel overland. 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.

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.

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.

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.

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.

The sign of the correction (bearings read clockwise from the north) will be as follows: In north latitude, the minus sign is used when the ship is east of the radiobeacon and the plus sign used when the ship is west of the radiobeacon. In south latitude, the plus sign is used when the ship is east of the radiobeacon, and the minus sign is used when the ship is west of the radiobeacon.

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

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.

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.

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 and DMAHTC Pub. 117A for details.)

Loran.–A list of stations and descriptive details of the Loran System are given in the Light Lists. Instructions, tables, and charts of the Loran System are published by the Defense Mapping Agency Hydrographic/Topographic Center. NOS shows loran lines on sailing, general, and coastal charts of the U.S. coasts.

Exact data cannot be given as to the accuracy to be expected in loran positions since the accuracy depends to a large extent on the skill of the operator, the condition and type of receiving equipment, and the area of operation. The accuracy of a loran fix is determined by the accuracy of the individual lines of positions used to establish the fix and by their angle of intersection.

Loran position determinations on or near the baseline extensions are subject to significant geometric errors and, therefore, should be avoided whenever possible. Loran is a long-range aid to navigation and should not normally be used in pilot waters. The use of skywaves is not recommended within 250 miles of either station.

Caution must be used in matching loran signals to ensure that the groundwave signal of the master station is not unknowingly matched with a skywave signal of a secondary station, or vice versa; or that a one-hop skywave signal from one station is not matched with a two-hop skywave signal from the other.

Omega.–Omega is a continuous radionavigation system which provides hyperbolic lines of position through phase comparisons of very low frequency (10–14 kHz range) continuous wave signals transmitted on a common frequency on a time shared basis. With eight transmitting stations located throughout the world, Omega provides worldwide, all-weather navigation coverage. Six stations make Omega available in nearly all parts of the globe, with the two other stations providing redundancy and coverage during off-air time for maintenance.

Users are cautioned that the Omega system is in an implementation stage. System changes and station off-air periods are promulgated by Notice to Mariners and radio navigational warning messages. Current information on the status of individual Omega transmitting stations is broadcast on station WWV, 16 minutes after the hour, and on station WWVH, 47 minutes after the hour. Current status reports are available by telephone (202–245–0298).

At the present time the worldwide accuracy and reliability of this system cannot be precisely determined. Therefore positioning information derived from Omega should not be totally relied upon without reference to other positioning methods.

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.

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 letters 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 south or west, indicating that danger lies to the north or east of the buoy. White buoys with black tops should be passed to the north or east. Danger lies to the south or west. 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.

DESTRUCTIVE WAVES. –Unusual sudden changes in water level can be caused by tsunamis or violent storms. These two types of destructive waves have become commonly known as **tidal waves,** a name which is technically incorrect as they are not the result of tide-producing forces.

Tsunamis (seismic sea waves) are setup by submarine earthquakes. Many such seismic disturbances do not produce sea waves and often those produced are small, but the occasional large waves can be very damaging to shore installations and dangerous to ships in harbors.

These waves travel great distances and can cause tremendous damage on coasts far from their source. The wave of April 1, 1946, which originated in the Aleutian Trench, demolished nearby Scotch Cap Lighthouse and caused damages of $25 million in the Hawaiian Islands 2,000 miles away. The wave of May 22-23, 1960, which originated off southern Chile, caused widespread death and destruction in islands and countries throughout the Pacific.

The speed of tsunamis varies with the depth of the water, reaching 300 to 500 knots in the deep water of the open ocean. In the open sea they cannot be detected from a ship or from the air because their length is so great, sometimes a hundred miles, as compared to their height, which is usually only a few feet. Only on certain types of shelving coasts do they build up into waves of disastrous proportions.

There is usually a series of waves with crests 10 to 40 minutes apart, and the highest may occur several hours after the first wave. Sometimes the first noticeable part of the wave is the trough which causes a recession of the water from shore, and people who have gone out to investigate this unusual exposure of the beach have been engulfed by the oncoming crest. Such an unexplained withdrawal of the sea should be considered as nature's warning of an approaching wave.

Improvements have been made in the quick determination and reporting of earthquake epicenters, but no method has yet been perfected for determining whether a sea wave

will result from a given earthquake. The Pacific Tsunami Warning Center, Oahu, Hawaii, of the National Oceanic and Atmospheric Administration is headquarters of a warning system which has field reporting stations (seismic and tidal) in most countries around the Pacific. When a warning is broadcast, waterfront areas should be vacated for higher ground, and ships in the vicinity of land should head for the deep water of the open sea.

Storm surge.–A considerable rise or fall in the level of the sea along a particular coast may result from strong winds and sharp change in barometric pressure. In cases where the water level is raised, higher waves can form with greater depth and the combination can be destructive to low regions, particularly at high stages of tide. Extreme low levels can result in depths which are considerably less than those shown on nautical charts. This type of wave occurs especially in coastal regions bordering on shallow waters which are subject to tropical storms.

Seiche is a stationary vertical wave oscillation with a period varying from a few minutes to an hour or more, but somewhat less than the tidal periods. It is usually attributed to external forces such as strong winds, changes in barometric pressure, swells, or tsunamis disturbing the equilibrium of the water surface. Seiche is found both in enclosed bodies of water and superimposed upon the tides of the open ocean. When the external forces cause a short-period horizontal oscillation of the water, it is called **surge.**

The combined effect of seiche and surge sometimes makes it difficult to maintain a ship in its position alongside a pier even though the water may appear to be completely undisturbed, and heavy mooring lines have been parted repeatedly under such conditions. Pilots advise taut lines to reduce the effect of the surge.

SPECIAL SIGNALS FOR CERTAIN VESSELS

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 samplers, etc., and divers working on, below or in proximity of the vessel) are required by Navigation Rules, International-Inland, Rule 27, to exhibit:

(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;

(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;

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

(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.

The color of the above shapes is black.

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.

The **wire drags** used by NOAA in sweeping for dangers to navigation may be crossed by vessels without danger of fouling at any point except between the towing launches and the large buoys near them, where the towline approaches the surface of the water. Vessels passing over the drag are requested to change course so as to cross it approximately at right angles, as a diagonal course may cause the propeller to foul the supporting buoys and attached wires. No attempt should be made to pass between the drag launches while the wire is being set out or taken in, unless it would endanger a vessel to do otherwise, because the bottom wire is slack and the floats at each 100–foot section may lift it nearly to the surface; at this time the launches usually are headed directly toward or away from each other and the operation may be clearly seen.

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.)

Minesweeper signals.–U.S. vessels engaged in minesweeping operations or exercises are hampered to a considerable extent in their maneuvering powers. With a view to indicating the nature of the work on which they are engaged, these vessels will show the signals hereinafter mentioned. For the public safety, all other vessels, whether steamers or sailing craft, must endeavor to keep out of the way of vessels displaying these signals and not approach them inside the distances mentioned herein, especially remembering that it is dangerous to pass between the vessels of a pair or group sweeping together.

All vessels towing sweeps are to show: **By day,** a black ball at or near the foremast head and a black ball at each end of the fore yard. **By night,** all-round green lights instead of the black balls, and in a similar manner.

Vessels or formations showing these signals are not to be approached nearer than 1,640 feet (500 meters) on either beam and vessels are not to cross astern closer than 3,280 feet (1,000 meters). Under no circumstances is a vessel to pass through a formation of minesweepers. Minesweepers should be prepared to warn merchant vessels which persist in approaching too close by means of any of the appropriate signals from the International Code of Signals. In fog, mist, falling snow, heavy rainstorms, or any other condition similarily restricting visibility, whether by day or night, minesweepers while towing sweeps when in the vicinity of other vessels will sound whistle signals for a vessel towing (one prolonged blast followed by two short blasts).

The United States is increasingly using helicopters to conduct minesweeping operations and exercises. When so engaged, helicopters, like vessels, are considerably hampered in their ability to maneuver. Helicopters may function at night as well as during the day and in varying types of weather. Accordingly, surface vessels approaching helicopters engaged in minesweeping operations should take precautions similar to those described above with regard to minesweeping vessels.

Helicopters towing minesweeping gear, and surface escorts, if any, will use all practical means to warn approaching ships of the operations being conducted. Where practical, measures will be taken to mark or light the gear being towed. While towing, the helicopter's altitude varies from 49.2 to 311.6 feet (15 to 95 meters) above the water, and speeds vary from 0 to 30 knots.

Minesweeping helicopters are equipped with a rotating beacon which has a selectable red and amber mode. The amber mode is used during towing operations to notify and warn other vessels that the helicopter is towing.

Submarine emergency identification signals.–U.S. submarines are equipped with signal ejectors which may be used to launch identification signals, including emergency signals. Two general types of signals may be used: smoke floats and flares or stars. The smoke floats, which burn on the surface,

produce a dense colored smoke for a period of 15 to 45 seconds. The flares or stars are propelled to a height of 300 to 400 feet from which they descend by small parachute. The flares or stars burn for about 25 seconds. The color of the smoke or flare/star has the following meaning:

Green or black is used under training exercise conditions only to indicate that a torpedo has been fired or that the firing of a torpedo has been simulated.

Yellow indicates the submarine is about to rise to periscope depth. Surface craft terminate antisubmarine counterattack and clear vicinity of submarine. Do not stop propellers.

Red indicates an emergency inside the submarine; she will try to surface immediately. Surface ships clear the area and stand by to assist. In case of repeated red signals, or if the submarine fails to surface in a reasonable time, she may be presumed disabled. Buoy the location, look for submarine buoy, and attempt to establish sonar communications. Advise U.S. Navy authorities immediately.

Submarine marker buoys consist of two spheres 3 feet in diameter with connecting structure, painted international orange. The buoy has a wire cable to the submarine, to act as a downhaul line for a rescue chamber. The buoy may be accompanied by an oil slick release to attract attention. A submarine on the bottom in distress may release this buoy. If sighted, such a buoy should be investigated and reported immediately to U.S. Navy authorities.

The submarine may transmit the International Distress Signal (SOS) on its sonar gear independently or in conjunction to the red signal. Submarines also may use these other means of attracting attention: release of dye marker or air bubble; ejection of oil; pounding on hull.

Vessels Constrained by their Draft.–International Navigation Rules, Rule 28, states that a vessel constrained by her draft may, in addition to the lights prescribed for power-driven vessels in Rule 23, exhibit where they can best be seen three all-round red lights in a vertical line, or a cylinder.

NAVIGATION RESTRICTIONS AND REQUIREMENTS

Traffic Separation Schemes (Traffic Lanes).–To increase the safety of navigation, particularly in converging areas of high traffic density, routes incorporating traffic separation have, with the approval of the International Maritime Organization (IMO), formerly the Inter-Governmental Maritime Consultative Organization (IMCO), been established in certain areas of the world. In the interest of safe navigation, it is recommended that through traffic use these schemes, as far as circumstances permit, by day and by night and in all weather conditions.

General principles for navigation in Traffic Separation Schemes are as follows:

1. A ship navigating in or near a traffic separation scheme adopted by IMO shall in particular comply with Rule 10 of the 72 COLREGS to minimize the development of risk of collision with another ship. The other rules of the 72 COLREGS apply in all respects, and particularly the steering and sailing rules if risk of collision with another ship is deemed to exist.

2. Traffic separation schemes are intended for use by day and by night in all weather, in ice-free waters or under light ice conditions where no extraordinary maneuvers or assistance by icebreaker(s) are required.

3. Traffic separation schemes are recommended for use by all ships unless stated otherwise. Bearing in mind the need for adequate underkeel clearance, a decision to use a traffic separation scheme must take into account the charted depth, the possibility of changes in the seabed since the time of last survey, and the effects of meteorological and tidal conditions on water depths.

4. A deepwater route is an allied routing measure primarily intended for use by ships which require the use of such a route because of their draft in relation to the available depth of water in the area concerned. Through traffic to which the above consideration does not apply should, if practicable, avoid following deepwater routes. When using a deepwater route mariners should be aware of possible changes in the indicated depth of water due to meteorological or other effects.

5. Users of traffic separation schemes adopted by IMO will be guided by Rule 10 of the 1972 International Regulations for Preventing Collisions at Sea (72 COLREGS) as follows:

(a) This Rule applies to traffic separation schemes adopted by the Organization.

(b) A vessel using a traffic separation scheme shall:

(i) proceed in the appropriate traffic lane in the general direction of traffic flow for that lane;

(ii) so far as practicable keep clear of a traffic separation line or separation zone;

(iii) normally join or leave a traffic separation lane at the termination of the lane, but when joining or leaving from either side shall do so at as small an angle to the general direction of traffic flow as practicable.

(c) A vessel shall so far as practicable avoid crossing traffic lanes, but if obliged to do so, shall cross as nearly as practicable at right angles to the general direction of traffic flow.

(d) Inshore traffic zones shall not normally be used by through traffic which can safely use the appropriate traffic lane within the adjacent traffic separation scheme. However, vessels of less than 20 meters in length and sailing vessels may under all circumstances use inshore traffic zones.

(e) A vessel, other than a crossing vessel, or a vessel joining or leaving a lane shall not normally enter a separation zone or cross a separation line except:

(i) in cases of emergency to avoid immediate danger;

(ii) to engage in fishing within a separation zone.

(f) A vessel navigating in areas near the terminations of traffic separation schemes shall do so with particular caution.

(g) A vessel shall so far as practicable avoid anchoring in a traffic separation scheme or in areas near its terminations.

(h) A vessel not using a traffic separation scheme shall avoid it by as wide a margin as is practicable.

(i) A vessel engaged in fishing shall not impede the passage of any vessel following a traffic lane.

(j) A vessel of less than 20 meters in length or a sailing vessel shall not impede the safe passage of a power-driven vessel following a traffic lane.

(k) A vessel restricted in her ability to maneuver when engaged in an operation for the maintenance of safety of navigation in a traffic separation scheme is exempted from complying with Rule 10 to the extent necessary to carry out the operation.

(l) A vessel restricted in her ability to maneuver when engaged in an operation for laying, servicing or picking up of a submarine cable, within a traffic separation scheme, is exempted from complying with this Rule to the extent necessary to carry out the operation.

6. The arrows printed on charts merely indicate the general direction of traffic; ships need not set their courses strictly along the arrows.

7. The signal "YG" meaning "You appear not to be

complying with the traffic separation scheme" is provided in the International Code of Signals for appropriate use.

When approved or established, traffic separation scheme details are announced in Notice to Mariners, and later depicted on appropriate charts and included in the Coast Pilot and Sailing Directions.

Oil Pollution.–The Federal Water Pollution Control Act, as amended, prohibits the discharge of a harmful quantity of oil or a hazardous substance into or upon the United States navigable waters or adjoining shorelines, or into or upon the waters of the contiguous zone, or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States including resources under the Fishery Conservation and Management Act of 1976. Discharges that do occur must be reported to the Coast Guard (National Response Center) by the most rapid available means. To assist in swift reporting of spills, a nationwide, 24-hour, toll-free telephone number has been established (1–800–424–8802).

Hazardous quantities of oil have been defined by the Environmental Protection Agency as those which violate applicable water quality standards or cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines, or cause a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines. (For regulations pertaining to this Act see 40 CFR 110.3, not carried in this Pilot.)

The Refuse Act of 1899 (33 U.S.C. 407) prohibits anyone from throwing, discharging or depositing any refuse matter of any kind in U.S. navigable waters or tributaries of navigable waters. The only exceptions to this prohibition are liquid sewage flowing from streets or sewers and discharges made from shore facilities under a permit granted by the U.S. Army Corps of Engineers.

The Act to Prevent Pollution from Ships (33 U.S.C. 1901) is based on the International Convention for the Prevention of Pollution from Ships, as modified by the Protocol of 1978 (MARPOL 73/78). For tankers over 150 gross tons and all other ships over 400 gross tons, MARPOL 73/78 requires the installation of new equipment to control overboard discharges of oil and oily waste. This includes oily-water separating, monitoring and alarm systems for discharges from cargo areas, cargo pump rooms and machinery space bilges. New ships must have the equipment on board by October 2, 1983, while existing ships have until October 2, 1986 to comply.

Ships are also required to have an International Oil Pollution Prevention Certificate verifying that the vessel is in compliance with MARPOL 73/78 and that any required equipment is on board and operational, and they must maintain a new Oil Record Book reporting all oil transfers and discharges. The Oil Record Book is available from the Government Printing Office (see appendix for address).

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.

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.

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.

Unnecessary whistling prohibited.–The unnecessary sounding of the vessel's whistle is prohibited within any harbor limits of the United States.

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.

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.

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

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.

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.

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 DMAHTC Pub. 117 for emergency procedures and communication instructions.)

Exclusive Economic Zone of the United States.–Established by a Presidential Proclamation on March 10, 1983, the Exclusive Economic Zone (EEZ) of the United States is a zone contiguous to the territorial sea, including zones contiguous to the territorial sea of the United States, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands (to the extent consistent with the Covenant and the United Nations Trusteeship Agreement), and United States overseas territories and possessions. The EEZ extends to a distance of 200 nautical miles from the baseline from which the breadth of the territorial sea is measured. In cases where the maritime boundary with a neighboring state remains to be deter-

mined, the boundary of the EEZ shall be determined by the United States and the other state concerned in accordance with equitable principles.

Within the EEZ, the United States has asserted, to the extent permitted by international law, (a) sovereign rights for the purpose of exploring, exploiting, conserving and managing natural resources, both living and nonliving, of the seabed and subsoil and the superjacent waters and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds; and (b) jurisdiction with regard to the establishment and use of artificial islands, and installations and structures having economic purposes, and the protection and preservation of the marine environment.

Without prejudice to the sovereign rights and jurisdiction of the United States, the EEZ remains an area beyond the territory and territorial sea of the United States in which all states enjoy the high seas freedoms of navigation, overflight, the laying of submarine cables and pipelines, and other internationally lawful uses of the sea.

This Proclamation does not change existing United States policies concerning the continental shelf, marine mammals and fisheries, including highly migratory species of tuna which are not subject to United States jurisdiction and require international agreements for effective management.

The United States will exercise these sovereign rights and jurisdiction in accordance with the rules of international law.

The seaward limit of the EEZ is shown on the nautical chart as a line interspersed periodically with EXCLUSIVE ECONOMIC ZONE. The EEZ boundary is coincidental with that of the Fishery Conservation Zone.

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.

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**.)

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.

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.

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 (156.65 MHz), 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 (156.65 MHz),the Bridge-to-Bridge Radiotelephone frequency, in addition to VHF-FM channel 16 (156.80 MHz), the National Distress, Safety and Calling frequency required by Federal Communications Commission regulations. (See 26.01 through 26.10, chapter 2, for Vessel Bridge-to-Bridge Radiotelephone Regulations.)

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.

VHF-FM Radiotelephone. –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.

Channel	Ship Frequency (MHz) Transmit	Receive	Channel Usage
1A	156.050	156.050	Port operations and commercial
5A	156.250	156.250	Port operations
6	156.300	156.300	Intership safety
7A	156.350	156.350	Commercial
8	156.400	156.400	Commercial (ship-to-ship only)
9	156.450	156.450	Commercial and non-commercial
10	156.500	156.500	Commercial

Channel	Ship Frequency (MHz) Transmit	Receive	Channel Usage
11	156.550	156.550	Commercial
12	156.600	156.600	Port operations (traffic advisories, including VTS in some ports)
13	156.650	156.650	Navigational (ship-to-ship), also used at locks and bridges
14	156.700	156.700	Port operations (traffic advisories, including VTS in some ports)
16	156.800	156.800	Distress, safety and calling
17	156.850	156.850	State or local government control
18A	156.900	156.900	Commercial
19A	156.950	156.950	Commercial
20	157.000	161.600	Port operations (traffic advisories)
22A	157.100	157.100	Coast Guard Liaison
24	157.200	161.800	Public correspondence (ship-to-coast)
25	157.250	161.850	Public correspondence (ship-to-coast)
26	157.300	161.900	Public correspondence (ship-to-coast)
27	157.350	161.950	Public correspondence (ship-to-coast)
28	157.400	162.000	Public correspondence (ship-to-coast)
63A	156.175	156.175	VTS New Orleans
65A	156.275	156.275	Port operations (traffic advisories)
66A	156.325	156.325	Port operations (traffic advisories)
67	156.375	156.375	Commercial (ship-to-ship only) (used in New Orleans VTS for ship-to-ship navigational purposes)
68	156.425	156.425	Non-commercial
69	156.475	156.475	Non-commercial
71	156.575	156.575	Non-commercial
72	156.625	156.625	Non-commercial (ship-to-ship only)
73	156.675	156.675	Port operations (traffic advisories)
74	156.725	156.725	Port operations (traffic advisories)
77	156.875	156.875	Port operations (ship-to-ship, to and from pilots docking ships)
78A	156.925	156.925	Non-commercial
79A	156.975	156.975	Commercial
80A	157.025	157.025	Commercial
84	157.225	161.825	Public correspondence (ship-to-coast)
85	157.275	161.875	Public correspondence (ship-to-coast)
86	157.325	161.925	Public correspondence (ship-to-coast)
87	157.375	161.975	Public correspondence (ship-to-coast)
88	157.425	162.025	Public correspondence in Puget Sound and parts of Great Lakes
88A	157.425	157.425	Commercial, fishing (ship-to-ship) (except in parts of Great Lakes)

2. NAVIGATION REGULATIONS

This chapter contains the sections of **Code of Federal Regulations, Title 33, Navigation and Navigable Waters (33 CFR)**, that are of most importance in the areas covered by Coast Pilot 3. The sections are from

Part 26, Vessel Bridge-to-Bridge Radiotelephone Regulations;

Part 80, COLREGS Demarcation Lines;

Part 110, Anchorage Regulations;

Part 117, Drawbridge Operation Regulations;

Part 160, Ports and Waterways Safety-General;

Part 162, Inland Waterway Navigation Regulations;

Part 164, Navigation Safety Regulations (in part);

Part 165, Regulated Navigation Areas and Limited Access Areas;

Part 166, Shipping Safety Fairways;

Part 167, Offshore Traffic Separation Schemes

Part 207, Navigation Regulations, and

Part 334, Danger Zones and Restricted Area Regulations.

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: U.S. Coast Guard (33 CFR 26, 80, 110, 117, 160, 162, 164, and 165); U.S. Army Corps of Engineers (33 CFR 207 and 334).

Part 26–Vessel Bridge-to-Bridge Radiotelephone Regulations

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

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

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

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

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

§26.02 Definitions. For the purpose of this part and interpreting the Act–

"Secretary" means the Secretary of the Department in which the Coast Guard is operating:

"Act" means the "Vessel Bridge-to-Bridge Radiotelephone Act", 33 U.S.C. sections 1201–1208;

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

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

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

§26.03 Radiotelephone required. (a) Unless an exemption is granted under §26.09 and except as provided in paragraph (a)(4) of this section, section 4 of the Act provides that–

(1) Every power-driven vessel of 300 gross tons and upward while navigating;

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

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

(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: Provided, That an unmanned or intermittently manned floating plant under the control of a dredge need not be required to have separate radiotelephone capability; Shall have a radiotelephone 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, after consultation with other cognizant agencies, for the exchange of navigational information.

(b) The radiotelephone required by paragraph (a) of this section shall be carried on board the described vessels, dredges, and floating plants upon the navigable waters of the United States inside the lines established pursuant to section 2 of the Act of February 19, 1895 (28 Stat. 672), as amended.

§26.04 Use of the designated frequency.

(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.

(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.

(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.

Note: –The Federal Communications Commission (FCC) has designated the frequency 156.65 MHz (Channel 13) for the use of bridge-to-bridge stations in most of the United States. However, FCC rules designate the frequency 156.375 MHz (Channel 67) to be used instead of Channel 13 in the following areas, except to facilitate transition from these areas: The Mississippi River from South Pass Lighted Bell Buoy "2" and Southwest Pass Entrance (midchannel) Lighted Whistle Buoy SW to mile 242.4 AHP (Above Head of Passes) near Baton Rouge; and in addition, over the full length of the Mississippi River-Gulf Outlet Canal from entrance to its junction with the Inner Harbor Navigation Canal, and over the full length of the Inner Harbor Navigation Canal from its junction with the Mississippi River to its entry to Lake Pontchartrain at the New Seabrook vehicular bridge.

§26.05 Use of radiotelephone. Section 5 of the Act states–

(a) 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 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 contained herein shall be interpreted as precluding the use of portable radiotelephone equipment to satisfy the requirements of this Act.

§26.06 Maintenance of radiotelephone; failure of radio-

telephone. Section 6 of the Act states– (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.

§26.07 English language. 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 he can speak the English language.

§26.08 Exemption procedures. (a) Any person may petition for an exemption from any provision of the Act or this part:

(b) Each petition must be submitted in writing to U.S. Coast Guard (G-W), 2100 Second Street SW., Washington, D.C. 20593, and must state–

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

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

§26.09 List of exemptions.

(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.

(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 1-7 of "The Agreement Between the United States of America and Canada for Promotion of Safety on the Great Lakes by Means of Radio, 1973."

§26.10 Penalties. Section 9 of the Act states– (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.

(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.

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

Part 80.–COLREGS Demarcation Lines

§80.01 General basis and purpose of demarcation lines.

(a) The regulations in this part establish the lines of demarcation delineating those waters upon which mariners shall comply with the International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) and those waters upon which mariners shall comply with the Inland Navigation Rules.

(b) The waters inside of the lines are Inland Rules waters. The waters outside the lines are COLREGS waters.

(c) 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.

§80.165 New York Harbor.

A line drawn from East Rockaway Inlet Breakwater Light to Sandy Hook Light.

§80.170 Sandy Hook, NJ to Tom's River, NJ.

(a) A line drawn from Shark River Inlet North Breakwater Light 2 to Shark River Inlet South Breakwater Light 1.

(b) A line drawn from Manasquan Inlet North Breakwater Light 4 to Manasquan Inlet South Breakwater Light 3.

(c) A line drawn from Barnegat Inlet North Breakwater Light 4A to the seaward extremity of the submerged Barnegat Inlet South Breakwater; thence along the submerged breakwater to the shoreline.

§80.501 Tom's River, NJ to Cape May, NJ.

(a) A line drawn from the seaward tangent of Long Beach Island to the seaward tangent to Pullen Island across Beach Haven and Little Egg Inlets.

(b) A line drawn from the seaward tangent of Pullen Island to the seaward tangent of Brigantine Island across Brigantine Inlet.

(c) A line drawn from the seaward extremity of Absecon Inlet.

(d) A line drawn from the southernmost point of Longport at latitude 30°18.2′N. longitude 75°32.2′W. to the northeasternmost point of Ocean City at latitude 39°17.6′N. longitude 74°33.1′W. across Great Egg Harbor Inlet North Jetty to Atlantic City Light.

(e) A line drawn parallel with the general trend of highwater shoreline across Corson Inlet.

(f) A line formed by the centerline of the Townsend Inlet Highway Bridge.

(g) A line formed by the shoreline of Seven Mile Beach and Hereford Inlet Light.

(h) A line drawn from Cape May Inlet East Jetty Light to Cape May Inlet West Jetty Light.

§80.503 Delaware Bay.

A line drawn from Cape May Light to Harbor of Refuge Light; thence to the northernmost extremity of Cape Henlopen.

§80.505 Cape Henlopen, Del. to Cape Charles, Va. (a) A line drawn from the seaward extremity of Indian River Inlet North Jetty to Indian River Inlet South Jetty Light.

(b) A line drawn from Ocean City Inlet Light 6, 225° true across Ocean City Inlet to the submerged south breakwater.

(c) A line drawn from Assateague Beach Tower Light to the tower charted at latitude 37°52.6′N. longitude 75°26.7′W.

(d) A line formed by the range of Wachapreague Inlet Light 3 and Parramore Beach Lookout Tower drawn across Wachapreague Inlet.

(e) A line drawn from the lookout tower charted on the

northern end of Hog Island to the seaward tangent of Parramore Beach.

(f) A line drawn 207° true from the lookout tower charted on the southern end of Hog Island across Great Machipongo Inlet.

(g) A line formed by the range of the two cupolas charted on the southern end of Cobb Island drawn across Sand Shoal Inlet.

(h) Except as provided elsewhere in this section from Cape Henlopen to Cape Charles, lines drawn parallel with the general trend of the highwater shoreline across the entrances to small bays and inlets.

§80.510 Chesapeake Bay Entrance, Va.

A line drawn from Cape Charles Light to Cape Henry Light.

Part 110–Anchorage Regulations

§110.1 General. (a) The areas described in Subpart A of this part are designated as special anchorage areas pursuant to the authority contained in an act amending laws for preventing collisions of vessels approved April 22, 1940 (54 Stat. 150); Article 11 of section 1 of the act of June 7, 1897, as amended (30 Stat. 98; 33 U.S.C. 180), Rule 9 of section 1 of the act of February 8, 1895, as amended (28 Stat. 647; 33 U.S.C. 258), and Rule Numbered 13 of section 4233 of the Revised Statutes as amended (33 U.S.C. 322). Vessels not more than 65 feet in length, when at anchor in any special anchorage area shall not be required to carry or exhibit the white anchor lights required by the Navigation Rules.

(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).

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

(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

§110.65 Indian River Bay, Del. Beginning at a point bearing 174°, 300 feet, from a point on the southerly edge of the project channel 5,500 feet westerly from the State highway bridge across Indian River Inlet; thence 174°, 600 feet; thence 264°, 800 feet; thence 354°, 600 feet; and thence 84°, 800 feet, to the point of beginning.

§110.67 Delaware River, Essington, Pa. North of Little Tinicum Island, between the mouth of Darby Creek and Jansen Avenue, Essington, bounded as follows: Beginning at a point (approximately latitude 39°51′31″, longitude 75°17′43″) on a line in prolongation of the westerly line of Jansen Avenue 135 yards southerly from the mean high water line; thence 184°, 300 yards; thence 274°30′, 1,700 yards; thence 04°, 425 yards; thence 100°, 1,225 yards; and thence 95°, 490 yards, to the point of beginning.

§110.70 Chesapeake and Delaware Canal, easterly of Courthouse Point, Md. The waters southerly of a line joining the northernmost extremity of Courthouse Point and the westernmost point of Herring Island; westerly of a line bearing 180° from a point on the aforesaid line 220 yards from the westernmost point of Herring Island; and northerly and easterly of the shore line.

§110.70a Northeast River, North East, Md. The water area west of North East Heights, Maryland enclosed by a line beginning on the shoreline at latitude 39°34′26″N., longitude 75°57′18″W.; thence westerly to latitude 39°34′26″N., longitude 75°57′29″W.; thence northeasterly to latitude 39°34′30″N., longitude 75°57′27″W.; thence easterly to the shoreline at latitude 39°34′30″N., longitude 75°57′18″W; thence southerly following the shoreline to the point of beginning.

§110.71 Jacobs Nose Cove, Elk River, Md.

The water area of Jacobs Nose Cove, on the west side of the mouth of Elk River, Maryland, comprising the entire cove south of Jacobs Nose as defined by the shoreline and a line bearing 046°–226° true across the entrance of the cove tangent to the shore on both the north and south sides.

§110.71a Cabin Creek, Grasonville, Md.

The waters of Cabin Creek, Maryland, enclosed by a line drawn from latitude 38°56′34″N., longitude 76°12′49″W., on the western shore to latitude 38°56′28″N., longitude 76°12′29″W., on the eastern shore; thence following the general line of the shore to the point of beginning.

§110.71b Wye River, Wye, Md.

The waters of a cove on the western shore of Wye River opposite Drum Point enclosed by a line drawn from latitude 38°53′17″N., longitude 76°11′23″W., to latitude 38°53′18″N., longitude 76°11′23″W., to latitude 38°53′18″N., longitude 76°11′13″W.; thence following the shoreline to the point of beginning.

§110.72 Blackhole Creek, Md. The waters on the west side of Blackhole Creek, a tributary of Magothy River, southwest of a line bearing 310°30′ from the most northerly tip of an unnamed island located 0.16 mile upstream from the mouth of the creek approximately 660 feet to the west shore of the creek; northwest of a line ranging from the southwesterly tip of the island toward the point of land on the west shore of the creek immediately southwest thereof; and north of a line 100 feet from and parallel to the shore of the creek to its intersection with the south property line extended of the Potapskut Sailing Association, Inc., thence northwesterly along the said property line extended to the shore.

§110.72a Chester River, southeast of Chestertown, Md. The waters of the Chester River enclosed by a line beginning at a point on the Rolph Marina pier at latitude 39°10′25″N., longitude 76°02′17″W.; thence 327° to a point 400 feet southwest of the entrance to Hambleton Creek at latitude 39°10′55″N., longitude 76°02′40″W.; thence northeasterly to the eastern side of the entrance to Hambleton Creek; thence southerly following the shoreline to the Rolph Point Marina pier; thence southwesterly along the Rolph Point Marina pier to the point of beginning.

Subpart B–Anchorage Grounds

§110.157 Delaware Bay and River. (a) The anchorage grounds–(1) Anchorage A off the entrance to Mispillion River. In Delaware Bay southwest of Brandywine Channel beginning at latitude 38°53′57″N., longitude 75°08′00″W., thence northwesterly to latitude 39°01′22″N., longitude 75°13′25″W., thence southwesterly to latitude 39°00′49″N., longitude 75°14′57″W., thence southeasterly to latitude 38°53′22″N., longitude 75°09′26″W., thence northeasterly to the point of beginning. Supervision over the anchoring of vessels and over all cargo transfer operations in Anchorage A is exercised by the Captain of the Port, Philadelphia. The regulations of paragraphs (b)(1) and (b)(2) of this section do not apply to this anchorage.

(2) Anchorage 1 off Bombay Hook Point. On the southwest side of the channel along Liston Range, bounded as

follows: Beginning at a point (approximately latitude 39°17′59″, longitude 75°23′07″) bearing 228° from Ship John Shoal Light, 167 yards southwest of the southwest edge of the channel along Liston Range; thence 228°, 2,000 yards; thence 318°, 8,000 yards; thence 48°, 2,000 yards; and thence 138°, 8,000 yards, to the point of beginning.

(3) Anchorage 2 northwest of Artificial Island. On the east side of the channel along Reedy Island Range, bounded as follows: Beginning at a point bearing 105° from the northernmost point of Reedy Island, 167 yards easterly of the east edge of the channel along Reedy Island Range; thence 105°, 800 yards; thence 195°, 4,500 yards; thence 285°, 800 yards to a point (approximately latitude 39°28′58″, longitude 75°33′37″) opposite the intersection of Reedy Island and Baker Ranges; and thence 15°, 4,500 yards, to the point of beginning.

(4) Anchorage 3 southeast of Reedy Point. Southeast of the entrance to the Chesapeake and Delaware Canal at Reedy Point, bounded on the east by the west edge of the channel along Reedy Island and New Castle Ranges; on the west by a line beginning at a point on the west edge of the channel along Reedy Island Range at latitude 39°31′43″, thence to a point bearing 168°30′, 3,150 yards, from Chesapeake and Delaware Canal 2 Light, and thence to a point bearing 131°, 1,160 yards, from Chesapeake and Delaware Canal 2 Light; and on the north by a line running from the last-described point 113°30′, approximately 813 yards, to the west edge of the channel along New Castle Range.

(5) Anchorage 4 north of Reedy Point. North of the entrance to the Chesapeake and Delaware Canal at Reedy Point, on the west side of the river, bounded as follows: Beginning at a point (approximately latitude 39°33′51″, longitude 75°33′35″) 344°58′ true, 160 yards from Chesapeake and Delaware Canal Light 2; thence 306°26′, 1,442 yards; thence 36°26′, 377 yards; thence 126°26′, 1,442 yards; thence 216°26′, 377 yards to the point of beginning.

(6) Anchorage 5 southeast of Pea Patch Island. On the northeast side of the channel along New Castle Range, bounded as follows: Beginning at latitude 39°34′28″, longitude 75°33′06″; thence 334°, 2,343 yards; thence 64°, 512 yards; thence 154°, 2,343 yards; and thence 244°, 512 yards, to the point of beginning.

(7) Anchorage 6 off Deepwater Point. Southeast of the entrance to Christina River, on the east side of the channel along Cherry Island Range, bounded as follows: Beginning at latitude 39°41′31″, longitude 75°30′55″; thence 17°, 2,747 yards; thence 112°, 847 yards; thence 215°, 1,340 yards; thence 204°, 893 yards; thence 186°30′, 500 yards; and thence 286°, 377 yards, to the point of beginning. Vessels must not cast anchor in the cable area at the lower end of this anchorage except in case of emergency.

(8) Anchorage 7 off Marcus Hook. On the southeast side of the channel along Marcus Hook Range, bounded as follows: Beginning at a point on the southeast edge of the channel at longitude 75°25′50″; thence northeasterly along the edge of the channel to longitude 75°23′30″; thence 207°, 933 yards; thence 237°, 2,692 yards; thence 267°, 933 yards, to the point of beginning. A preferential area in this anchorage is designated for the use of vessels awaiting quarantine inspection, this area being 333 yards wide on the downstream side of a line projected from Blueball Road in Marcus Hook. Should the remainder of the anchorage be in use, the preferential area, when available, may be used by vessels not subject to quarantine inspection.

(9) Anchorage 8 off Thompson Point. On the south side of the channel along Tinicum Range, between Thompson Point and the east side of Crab Point, bounded as follows: Beginning at a point on the south edge of the channel along Tinicum Range at longitude 75°18′24″; thence easterly along the edge of the channel to longitude 75°17′54″; thence 179°, 267 yards; thence 260°30′, 793 yards; thence 358°, 425 yards, to the point of beginning.

(10) Anchorage 9 near entrance to Mantua Creek. On the southeast side of the channel along Mifflin Range, bounded as follows: Beginning at a point on the southeast edge of the channel at longitude 75°14′26″; thence northeasterly along the edge of the channel to longitude 75°12′01.5″; thence 203°30′, 933 yards; thence 233°30′, 3,058 yards; and thence 263°30′, 933 yards, to the point of beginning. Vessels must not cast anchor in this anchorage in such manner as to interfere unreasonably with the passage of other vessels to and from Mantua Creek.

(11) Anchorage 10 (naval) at Naval Base, Philadelphia. On the north side of the channel along West Horseshoe Range, bounded as follows: Beginning at the southeasterly corner of Pier 7 (approximately latitude 39°53′11″, longitude 75°09′58.5″); thence 174°, 525 yards, to the north edge of the channel along West Horseshoe Range; thence 273°30′ along the edge of the channel, 880 yards; thence 354°, 433 yards, to the southeasterly corner of Pier 1; and thence 88°30′, 875 yards, to the point of beginning. This is a restricted naval anchorage.

(12) Anchorage 11 at Gloucester. On the east side of the channel south of the Walt Whitman Bridge at Gloucester, bounded as follows: Beginning at a point on the east edge of the channel at latitude 39°54′16″; thence 174°30′, 500 yards, to latitude 39°54′02″, longitude 75°07′43″; thence 202°, 1,133 yards; thence 217°30′, 1,142 yards, to the east edge of channel; thence northeasterly along the edge of the channel to the point of beginning.

(13) Anchorage 12 between Gloucester and Camden. On the east side of the channel adjoining and on the upstream side of Anchorage 11, from Gloucester to Camden, bounded as follows: Beginning at a point on the east edge of the channel at latitude 39°54′16″; thence northerly along the edge of the channel to latitude 39°56′32.5″; thence 133°, 283 yards to a point on a line 100 feet west of the established pierhead line; thence southerly along this line to latitude 39°54′34″; thence 196°16′, 882 yards to latitude 39°54′08.5″; thence 354°36′, 267 yards to the point of beginning. The area between New York Shipbuilding Corporation Pier No. 2 and the MacAndrews and Forbes Company pier, Camden, shall be restricted to facilitate the movement of carfloats to and from Bulson Street, Camden. The area in front of the Public Service Electric and Gas Company pier shall be restricted to facilitate the movement of vessels to and from the pier. Should the anchorage become so congested that vessels are compelled to anchor in these restricted areas, they must move immediately when another berth is available.

(14) Anchorage 13 at Camden. On the east side of the channel adjoining and on the upstream side of Anchorage 12, to Cooper Point, Camden, bounded as follows: Beginning at a point on the east edge of the channel at latitude 39°56′32.5″; thence northerly along the edge of the channel to latitude 39°57′39.7″; thence 139°, 217 yards to a point on a line 100 feet west of the established pierhead line; thence southerly along this line to latitude 39°56′26.5″; thence 313°, 283 yards to the point of beginning.

(15) Anchorage 14 opposite Port Richmond. On the southeast side of the channel, north of Petty Island, bounded as follows: Beginning at a point on the southeast edge of the channel at longitude 75°05′43″; thence 163°, 248 yards; thence 253°, 1,978 yards, to the southeast edge of the channel; and thence northeasterly along the edge of the

channel to the point of beginning. Vessels having a draft of less than 20 feet must anchor southwest of Pier No. 11, Port Richmond. The area off the Cities Service Oil Company wharves, Petty Island, shall be restricted to facilitate the movement of vessels to and from the wharves.

(16) Anchorage 15 off northeasterly end of Petty Island. On the southeast side of the channel, bounded as follows: Beginning at a point on the southeast edge of the channel at longitude 75°05′34.7″; thence northeasterly along the southeast edge of the channel to longitude 75°05′09.5″; thence 171°, 198 yards; thence 260°30′, 667 yards; and thence 351°, 198 yards, to the point of beginning. When necessary, this anchorage will be reserved for vessels under the custody of the United States, at which time other vessels may be required by the Captain of the Port to shift position.

(17) Anchorage 16 between Port Richmond and Five Mile Point. On the northwest side of the channel, bounded as follows: Beginning at a point on the northwest edge of the channel at longitude 75°05′35″; thence northeasterly along the edge of the channel to longitude 75°04′20″; thence 328°, 125 yards; thence 243°, 450 yards; thence 251°, 475 yards; thence 257°, 1,042 yards; thence 174°30′, 122 yards, to the point of beginning. When necessary, this anchorage will be reserved for vessels under the custody of the United States, at which time other vessels may be required by the Captain of the Port to shift position.

(b) General regulations. (1) Except in cases of great emergency, no vessel shall be anchored in Delaware Bay and River between Ship John Light and The Pennsylvania Railroad Company bridge at Delair, New Jersey, outside of the anchorage areas established in this section, or within a cable or pipe line area shown on a Government chart, or be moored, anchored, or tied up to any pier, wharf, or other vessel in such manner as to obstruct or endanger the passage of any vessel. When an emergent condition exists due to congestion in the prescribed anchorage areas in the Delaware River, the Captain of the Port may authorize the anchorage of vessels in locations other than the prescribed areas. Vessels so anchored must not be anchored within the channel limits. Any vessel anchored outside of the prescribed anchorage limits must move to a prescribed anchorage area when space becomes available.

(2) No vessel shall occupy any prescribed anchorage for a longer period than 48 hours without a permit from the Captain of the Port for that purpose. No vessel in such condition that it is likely to sink or otherwise become a menace or obstruction to navigation or anchorage of other vessels shall occupy an anchorage except in an emergency, and then only for such period as may be permitted by the Captain of the Port.

(3) Whenever, in the opinion of the Captain of the Port such action may be necessary, he may require any or all vessels in any designated anchorage area to moor with two or more anchors.

(4) (Reserved)

(5) Anchors shall be placed well within the anchorage areas, so that no portion of the hull or rigging will at any time extend outside of the anchorage area.

(6) Light-draft barges using the anchorages shall be anchored away from the deeper portions of the anchorages, so as not to interfere with the anchoring of deep-draft vessels. Any barges towed in tandem to an anchorage area shall be bunched together when anchoring.

(7) Upon approval of the District Engineer, Corps of Engineers, the Captain of the Port may permit wrecking plant or other vessels legally engaged in recovering sunken property, or in laying or repairing pipe lines or cables, or plant engaged in dredging operations, to anchor in channels. Such permission is not necessary for plant engaged upon works of river and harbor improvement under the supervision of the District Engineer, but the District Engineer will notify the Captain of the Port in advance of all such proposed work.

(8) (Reserved)

(9) A vessel upon being notified to shift its position shall get under way at once or signal for a tug and shall change position as directed with reasonable promptness.

(10) Nothing in this section shall be construed as relieving any vessel or the owner or person in charge of any vessel from the penalties of law for obstructing navigation or for obstructing or interfering with range lights, or for not complying with the laws relating to lights and fog signals or other navigation laws and regulations.

(c) Regulations for vessels carrying and handling explosives. (1) All vessels carrying explosives as defined in and subject to, Title 46 Code of Federal Regulations, Part 146, or Title 49 Code of Federal Regulations, Parts 171-177, or on which such explosives are to be loaded, shall obtain a permit from the Captain of the Port, except as provided in paragraph (c)(5) of this section. The maximum amount of explosives for which a permit is required in 46 CFR Part 146, and 49 CFR Parts 171-177, which may be carried or loaded at any time by a vessel shall not exceed 800 tons, except in cases of great emergency or by special permit from the Captain of the Port. This written permit shall be obtained from the Captain of the Port before vessels carrying explosives or on which explosives are to be loaded within the weight limit specified in paragraph (c)(1) of this section, may anchor in any anchorage. Permits will not be issued for Anchorage 2 under any circumstances. Such permit may be revoked at any time. All vessels used in connection with loading, or unloading explosives shall carry written permits from the Captain of the Port, and shall show such permit whenever required by him or his representative.

(2) Vessels handling explosives shall be anchored so as to be at least 2,200 feet from any other vessel, but the number of vessels which may anchor in an anchorage at any one time shall be at the discretion of the Captain of the Port. This provision is not intended to prohibit barges or lighters from tying up alongside the vessels for the transfer of cargo.

(3) Whenever a vessel or barge not mechanically self-propelled anchors while carrying explosives or while awaiting the loading of explosives, the Captain of the Port may require the attendance of a tug upon such vessel or barge when in his judgment such action is necessary.

(4) Fishing and navigation are prohibited within an anchorage whenever occupied by an anchored vessel displaying a red flag.

(5) The District Engineer, U.S. Army Corps of Engineers, may authorize, in writing, a vessel carrying explosives for use on river and harbor works or on other work under Department of the Army permit, to anchor in or near the vicinity of such work. The Captain of the Port will prescribe the conditions under which explosives shall be stored and handled in such cases.

(6) Vessels carrying explosives or on which explosives are to be loaded, within the weight limit specified in subparagraph (c)(1) of this paragraph, shall comply with the general regulations in paragraph (b) of this section when applicable.

(7) Nothing in this section shall be construed as relieving any vessel or the owner or person-in-charge of any vessel, and all others concerned, of the duties and responsibilities imposed upon them to comply with the regulations governing the handling, loading or discharging of explosives entitled "Subchapter C-Hazardous Materials Regulations"

(49 CFR Part 171 through 177) or "Subchapter N-Dangerous Cargoes" (46 CFR Part 146).

§110.158 Baltimore Harbor, Md. (a) The anchorage grounds–(1) Anchorage No. 1, general anchorage. In the Patapsco River at Fort McHenry angle beginning at latitude 39°15′13″, longitude 76°34′08.5″; thence southwest to latitude 39°15′10.5″, longitude 76°34′12.5″; thence southeast to latitude 39°14′52.5″, longitude 76°33′54″; thence east-southeast to latitude 39°14′48″, longitude 76°33′42″; thence northwest to the point of beginning. This anchorage shall be reserved for deep draft vessels and shall be used only by vessels waiting overnight to proceed to pier facilities. No vessel shall remain in this anchorage for more than 12 hours without a written permit from the Captain of the Port. Vessels anchored in this anchorage shall insure that they do not project into Fort McHenry Channel.

(2) Anchorage No. 2, general anchorage. In the Patapsco River, 2000 yards southeast of Lazaretto Point beginning at latitude 39°15′05″, longitude 76°33′47″; thence southeast to latitude 39°14′49″, longitude 76°33′29.5″; thence northeast to latitude 39°14′58″, longitude 76°33′15″; thence southeast to latitude 39°14′40.5″, longitude 76°32′57″; thence northeast to latitude 39°14′50″, longitude 76°32′41.5″; thence northwest to latitude 39°15′19″, longitude 76°33′11.5″; thence west to latitude 39°15′19″, longitude 76°33′29.5″; thence southwest to the point of beginning. This is a general anchorage for ships with drafts of less than 24 feet. No vessel shall remain in this anchorage for more than 72 hours without a written permit from the Captain of the Port.

(3) Anchorage No. 3, general anchorage. In the Patapsco River 3,000 yards southeast of Lazarette Point beginning at latitude 39°14′49″, longitude 76°33′29.5″; thence northeast to latitude 39°14′58″, longitude 76°33′15″; thence southeast to latitude 39°14′23.5″, longitude 76°32′39″; thence southwest to latitude 39°14′14″, longitude 76°32′53.5″; thence northwest to the point of beginning. This is a general anchorage for deep draft vessels only. No vessel shall remain in this anchorage for more than 72 hours without a written permit from the Captain of the Port.

(4) Anchorage No. 4, general anchorage. In the Patapsco River 1,000 yards southwest of Dundalk Marine Terminal beginning at latitude 39°14′18.5″, longitude 76°32′38.5″; thence southeast to latitude 39°14′00″, longitude 76°32′19″; thence southwest to latitude 39°13′53″, longitude 76°32′31″; thence northwest to latitude 39°14′11″, longitude 76°32′50″; thence northeast to the point of beginning. This is a general anchorage for vessels with drafts of less than 30 feet. No vessel shall remain in this anchorage for more than 72 hours without a written permit from the Captain of the Port.

(5) Anchorage No. 5, general anchorage. In the Patapsco River in the angle between Fort McHenry Channel and Curtis Bay Channel beginning at latitude 39°14′07″, longitude 76°32′58.5″; thence southeast to latitude 39°13′34″, longitude 76°32′24″; thence south-southwest to latitude 39°13′22″, longitude 76°32′29″; thence west to latitude 39°13′21″, longitude 76°33′12″; thence north-northeast to the point of beginning. This is a general anchorage for vessels having drafts of 19 feet or less. No vessel shall remain in this anchorage for more than 72 hours without a written permit from the Captain of the Port.

(6) Anchorage No. 6, general anchorage. In the Patapsco River approximately 2,000 yards west of Sollers Point beginning at latitude 39°13′47.8″N., longitude 76°32′25″W.; thence northeasterly to latitude 39°14′02″N., longitude 76°32′02.9″W.; thence southeasterly to latitude 39°13′34″N., longitude 76°31′33.5″W.; thence southwesterly to latitude 39°13′20″N., longitude 76°31′56″W.; thence northwesterly to the point of beginning. No vessel with a draft of more than 20 feet may use this general anchorage. No vessel may remain in this anchorage for more than 72 hours without written permit from the Captain of the Port.

(7) (Reserved).

(8) Dead ship anchorage. In Curtis Bay beginning on the shoreline at latitude 39°13′00″, longitude 76°34′11.5″; thence north to latitude 39°13′13.5″, longitude 76°34′12″; thence east to latitude 39°13′14″, longitude 76°33′31″; thence south to the shoreline at latitude 39°12′54″, longitude 76°33′31″. This anchorage shall be used as a dead ship anchorage only. A written permit from the Captain of the Port must be obtained prior to the use of this anchorage for any period of time.

(b) General regulations. (1) Except in cases where unforeseen circumstances create conditions of imminent peril, or with the permission of the Captain of the Port, no vessel shall be anchored in Baltimore Harbor and Patapsco River outside of the anchorage areas established in this section for more than 24 hours. No vessel shall anchor within a tunnel, cable or pipeline area shown on a Government chart. No vessel shall be moored, anchored, or tied up to any pier, wharf, or other vessel in such manner as to extend into established channel limits. No vessel shall be positioned so as to obstruct or endanger the passage of any other vessel.

(2) No vessel in such condition that it is likely to sink or otherwise become a menace or obstruction to navigation or anchorage of other vessels, shall occupy an anchorage except in cases where unforeseen circumstances create conditions of imminent peril to personnel and then only for such period as may be authorized by the Captain of the Port.

(3) Whenever, in the opinion of the Captain of the Port, such action may be necessary, he may require any vessel in a designated anchorage area to moor with two or more anchors.

(4) Every vessel that will not have sufficient personnel on board to weigh anchor at any time shall be anchored with two anchors with mooring swivel, unless the Captain of the Port, upon application, waives this requirement.

(5) Light-draft barges shall be anchored away from the deeper portions of the anchorages, so as not to interfere with the anchoring of deep-draft vessels. Any barges towed in tandem to an anchorage area shall be nested together when anchoring.

(6) No vessel shall be navigated within an anchorage at a speed exceeding 6 knots.

(7) A vessel being notified by the Captain of the Port or his authorized representative to shift its position shall take steps to promptly make the change.

(8) Nothing in this section shall be construed as relieving any vessel, or the owner or person in charge of any vessel, from the penalties of law for obstructing navigation or for obstructing or interfering with range lights, or for not complying with the laws relating to lights, day signals and fog signals or other navigation laws and regulations.

§110.159 Annapolis Harbor, Md. (a) The Anchorage Grounds–(1) Naval Anchorage for Deep Draft Vessels. In the Chesapeake Bay, bounded on the north by latitude 38°58′00″; on the east by a line bearing 203° from latitude 38°58′00″, longitude 76°24′00″; on the south by latitude 38°56′30″; and on the west by a line bearing 139° from Greenbury Point Shoal Light. This anchorage is reserved for deep draft naval vessels. Berths in the area will be assigned on application to the Superintendent, U.S. Naval Academy.

(2) Middle Ground Anchorage. Beginning at a point in the Severn River 139°, 620 yards from Triton Light (located at the intersection of the northeast and southeast seawall of the Naval Academy grounds); thence easterly to a point

112°30′, 970 yards from Triton Light; thence southeasterly to a point 274°, 1,045 yards from the radio tower at the tip of Greenbury Point; thence south-southeasterly to a point 233°30′, 925 yards from the radio tower at the tip of Greenbury Point; thence west to a point 295°, 1,015 yards from Greenbury Point Shoal Light; thence northwesterly to the point of beginning.

(3) South Anchorage. In the Severn River, beginning at a point on the shoreline at Horn Point, Eastport, 168°, 1,190 yards from Triton Light; thence east to a point 294°, 1,075 yards from Greenbury Point Shoal Light; thence northwest to a point 143°, 595 yards from Triton Light; thence westerly to a point 209°, 700 yards from Triton Light; thence 180° to a point on the shoreline at Eastport. No vessel shall anchor within 100 feet of any wharf, marine railway, or other structure without the permission of the owner thereof.

(4) Naval Anchorage for Small Craft. In the Severn River, beginning at a point 80 feet off the southeast seawall of the Naval Academy bearing 132° from Triton Light; thence easterly to a point 072°30′, 285 yards from Triton Light; thence southeasterly to a point 109°, 785 yards from Triton Light; thence westerly to a point 211°, 537 yards from Triton Light; thence northwesterly to a point 45 yards off the southeast seawall of the Naval Academy bearing 214°, 535 yards from Triton Light; thence northeasterly to the point of beginning. Except in the case of emergency, no vessel shall be anchored in this area without the permission of the Superintendent, U.S. Naval Academy. Anchorages will be assigned upon request to the Superintendent, U.S. Naval Academy.

(5) Anchorage A. In Spa Creek beginning at a point on the shoreline 219°30′, 545 yards from Triton Light; thence southeasterly to a point 214°30′, 555 yards from Triton Light; thence southwesterly to a point 237°30′, 185 yards from the Naval Academy Light; thence southwesterly to a point 235°30′, 315 yards from the Naval Academy Light; thence westerly to a point 240°, 410 yards from the Naval Academy Light; thence northeasterly to a point 244°, 305 yards from the Naval Academy Light; thence northeasterly to a point on the shoreline 255°, 205 yards from the Naval Academy Light.

(6) Anchorage B. In Spa Creek beginning at a point 223°, 185 yards from the Naval Academy Light; thence southeasterly to a point 214°, 190 yards from the Naval Academy Light; thence southwesterly to a point 211°, 335 yards from the Naval Academy Light; thence southwesterly to a point 212°, 520 yards from the Naval Academy Light; thence northwesterly to a point 229°30′, 465 yards from the Naval Academy Light; thence northeasterly to the point of beginning.

Note.–The City Council of Annapolis has promulgated local ordinances to control the building of structures, and mooring and anchorage of vessels in anchorages (a)(2), (a)(3), (a)(5), and (a)(6). These local ordinances will be enforced by the local Harbor Master.

(b) The regulations. (1) Except in the case of emergency, no vessel shall be anchored in the area to the north and east of the Annapolis Channel bounded on the east by Greenbury Point; on the south by a line bearing 270° from the southern tip of Greenbury Point; on the west by the Annapolis Channel; on the north by the southern boundary of the cable area and the shoreline of the Government reservation and Carr Creek.

(2) Except in the case of emergency, no vessel shall be anchored in Annapolis Harbor to the westward of the dredged channel and northward of the southern boundary of the South Anchorage outside of the established anchorage areas, except in Spa Creek and the area to the southwestward of the Naval anchorage for small craft. No vessel shall be so anchored that any part of the vessel extends at any time within this area. Any vessel anchoring, under great emergency, within this area shall be placed as close to an anchorage area as practicable, and shall move away immediately after the emergency ceases.

(3) No vessel shall be anchored in the cable and pipeline area, lying between the Naval Academy and the Naval Ship Research and Development Laboratory and having the following limits: Southeastern limit, from Triton Light 072° to white "Cable Crossing" sign at the Naval Ship Research and Development Laboratory; northwestern limit, a line bearing 054° from the Capitol Dome.

(4) Except in the case of emergency, no vessel shall be anchored, without permission of the Superintendent, U.S. Naval Academy, in the Naval Academy Drill area described as follows:

That portion of the Severn River lying to the northeastward of the Naval Academy, bounded on the north by the State Highway Bridge and on the south by the northern limit of the cable and pipeline area, excluding that area off the eastern shoreline enclosed by a line bearing approximately 131° from the eastern abutment of the State Highway Bridge to the vicinity of Ferry Point. This drill area also includes the lower part of Dorseys Creek below the Naval Academy Drawbridge. Requests to anchor in this drill area shall be made to the Superintendent, U.S. Naval Academy.

(5) The restrictions in this section do not apply to the anchoring or marking by buoys or apparatus used for the purpose of taking seafood, except within the cable or pipeline area described in paragraph (b)(3) of this subsection.

(6) The regulations in paragraph (b) shall be enforced by the Superintendent, U.S. Naval Academy, and such agencies as he may designate.

§110.166 York River, Va., naval anchorage. (a) The anchorage grounds. Between Yorktown and the Naval Mine Depot, beginning at latitude 37°15′34″, longitude 76°31′25″; thence to latitude 37°15′25″, longitude 76°31′39.5″; thence to latitude 37°16′21.5″, longitude 76°32′46″; thence to latitude 37°17′07.5″, longitude 76°34′17″; thence to latitude 37°17′55″, longitude 76°35′14.5″; thence to latitude 37°18′05″, longitude 76°35′01″; thence to latitude 37°17′20″, longitude 76°34′07″; thence to latitude 37°16′33.5″, longitude 76°32′34″, and thence to the point of beginning.

(b) The regulations. This anchorage is reserved for the exclusive use of naval vessels and except in cases of emergency, no other vessel shall anchor therein without permission from the local naval authorities, obtained through the Captain of the Port, Norfolk, Virginia. Movement of vessels through the anchorage will not be restricted.

§110.168 Hampton Roads, Va., and adjacent waters. (a) Hampton Roads–(1) Anchorage A, Hampton Bar. South of a line running from latitude 37°00′45″, longitude 76°20′36″, across the mouth of Hampton Creek to latitude 37°00′47″, longitude 76°19′56″; thence along the shore to a point east of Mill Creek at latitude 37°00′44″, longitude 76°19′38″; thence to latitude 37°00′15″, longitude 76°19′29″; thence to latitude 36°59′33″, longitude 76°18′57″; thence to latitude 36°59′11″, longitude 76°19′00″; thence to latitude 36°59′09″, longitude 76°19′05″; thence to latitude 37°00′00″, longitude 76°22′08″; and thence northeast along the shoreline to the point of beginning.

(i) No vessel shall be anchored in such manner as to

swing within 200 feet of the dredged channel leading to Hampton.

(ii) This anchorage is reserved for the use of vessels while undergoing examination by quarantine, customs, or immigration authorities. Upon completion of these examinations vessels shall move promptly to a regular anchorage.

(iii) The master of every mechanically propelled vessel using this anchorage shall keep the vessel in condition to move promptly under its own power upon notification by the Captain of the Port, and when any such vessel is in charge of a pilot the pilot shall remain on board until the vessel is safely anchored in a regular anchorage. No sailing vessel using this anchorage shall be left unattended by a tugboat while undergoing examination by quarantine, customs, or immigration authorities, except when its stay is likely to be of several hours' duration when it shall be anchored in the western part of the anchorage out of the way of other vessels before the tug and pilot leave.

(iv) No master of a vessel awaiting or undergoing quarantine inspection shall release any part of the crew until the vessel has been passed by the proper quarantine officials and safely anchored or moored in a regular anchorage.

(2) Anchorage B, Hampton Flats (Naval). Shoreward of a line described as follows: Beginning at latitude 37°00′00″, longitude 76°22′08″; thence to latitude 36°59′08.5″, longitude 76°19′04.5″; thence to latitude 36°57′57.5″, longitude 76°20′46.5″; and thence to latitude 36°58′56″, longitude 76°23′47″, including within the above-described limits an Explosives Handling Berth W covering a circular area of 1,200 yards diameter with its center at latitude 36°58′18″, longitude 76°20′51″.

(i) Vessels shall not be anchored within 425 yards of Anchorage F–1 when that anchorage is occupied by a vessel carrying explosives.

(ii) Vessels shall not be anchored within 300 yards of Explosives Handling Berth W when that berth is occupied by a vessel handling explosives.

(iii) Anchorage B, including Explosives Handling Berth W, is reserved for the use of Naval vessels, but in the absence of the fleet the Captain of the Port may, in his discretion, permit the anchorage and berth to be used by merchant vessels. Upon notification that need for occupancy by Naval vessels is expected, the Captain of the Port may cause a sufficient area in the anchorage to be vacated to accommodate the number of Naval vessels scheduled to arrive.

(3) Anchorage C, Newport News Bar. Shoreward of a line described as follows: Beginning at latitude 36°58′56″, longitude 76°23′47″; thence to latitude 36°57′57.5″, longitude 76°20′46.5″; thence to latitude 36°57′41″, longitude 76°21′12.5″; thence to latitude 36°57′35.5″, longitude 76°21′29″; thence along the north side of Newport News Channel to latitude 36°57′20″, longitude 76°24′38″; and thence to the radio tower at approximately latitude 36°57′47.5″, longitude 76°24′40.5″.

(i) When Anchorage F–1, which lies within Anchorage C, is not occupied by vessels carrying explosives, it may be used as a general anchorage in the same manner as other portions of Anchorage C. It shall be vacated promptly upon notice from the Captain of the Port when a vessel carrying explosives, of a draft too great to permit it to use Anchorage F, desires to anchor therein. Vessels shall not be anchored within 425 yards of Anchorage F–1 when that anchorage is occupied by a vessel carrying explosives.

(ii) This anchorage is a general anchorage for all vessels, but when fleet operations are scheduled the Captain of the Port may, in his discretion, permit it to be used by naval vessels. Upon receiving word that any part of the fleet is expected, the Captain of the Port may cause a sufficient area in this anchorage to be vacated to accommodate the number of vessels scheduled to arrive.

(4) Anchorage D. Beginning at a point west of Norfolk Harbor Channel at latitude 36°57′55″, longitude 76°20′31.3″; thence south to latitude 36°57′06″, longitude 76°20′32″; thence to latitude 36°57′14.8″, longitude 76°20′46.5″; thence to latitude 36°56′08″, longitude 76°22′23″; thence to latitude 36°56′00″, longitude 76°22′50″; thence to latitude 36°56′00″, longitude 76°23′34″; thence to latitude 36°56′09.5″, longitude 76°23′33.5″; thence to latitude 36°57′18.5″, longitude 76°21′52″; thence to a point on the south side of Newport News Channel at latitude 36°57′23.8″, longitude 76°22′03.8″; thence along the south side of Newport News Channel to latitude 36°57′28″, longitude 76°21′11″; thence to the point of beginning.

(i) Vessels shall be anchored so as to leave a clear fairway 200 yards wide through this anchorage for the operation of shallow-draft vessels and tows.

(ii) This anchorage shall be used by deep-draft vessels, wind-bound vessels from Lambert Point and Sewall Point, and vessels awaiting turn for docking. Other vessels may use this anchorage when permitted by the Captain of the Port.

(5) Anchorage E, Newport News Middle Ground. Beginning at a point on the south side of Newport News Channel at latitude 36°57′23.8″, longitude 76°22′03.8″; thence to latitude 36°57′18.5″, longitude 76°21′52″; thence to latitude 36°56′09.5″, longitude 76°23′33.5″; thence to a point on the south side of Newport News Channel at 36°57′09.8″, longitude 76°24′51.9″; thence along the south side of Newport News Channel to the point of beginning.

(i) Vessels shall be anchored so as to leave a clear fairway 200 yards wide through this anchorage for the operation of shallow-draft vessels and tows.

(6) Anchorage H. Beginning at a point west of Norfolk Harbor Channel at latitude 36°57′01.8″, longitude 76°20′22.3″; thence to latitude 36°57′14.8″, longitude 76°20′46.5″; thence to latitude 36°56′08″, longitude 76°22′23″; thence to latitude 36°56′00″, longitude 76°22′50″; thence to latitude 36°56′00″, longitude 76°20′27″; thence along the west side of Norfolk Harbor Channel to the point of beginning.

(i) Vessels shall be anchored so as to leave a clear fairway 200 yards wide through this anchorage for the operation of shallow-draft vessels and tows.

(7) Anchorages for vessels carrying explosives–(i) Anchorage F (for shallow draft vessels). Beginning at latitude 36°56′03″, longitude 76°23′50″; thence to latitude 36°54′30″, longitude 76°23′55.5″; thence to latitude 36°54′30″, longitude 76°24′59″; thence to latitude 36°56′31″, longitude 76°24′50.1″; thence to latitude 36°56′31″, longitude 76°24′30.7″; thence to the point of beginning.

(ii) Anchorage F–1 (for deep-draft vessels). Within Anchorage C and having a northeast boundary coincident with a portion of the northeast boundary of Anchorage C, beginning at latitude 36°58′06″, longitude 76°21′13″; thence to latitude 36°57′49.5″, longitude 76°21′36″; thence to latitude 36°57′47.5″, longitude 76°22′04″; thence to latitude 36°57′56″, longitude 76°22′30″; thence to latitude 36°58′19.5″, longitude 76°21′56″; thence to the point of beginning.

(iii) Vessels are forbidden to anchor within 425 yards of Anchorage F or between the northeast boundary of Anchorage F and the southwest boundary of Anchorage E.

(iv) When Anchorage F–1 is not occupied by vessels carrying explosives it may be used as a general anchorage in

the same manner as other portions of Anchorage C, except that it shall be vacated promptly upon notice from the Captain of the Port when a vessel carrying explosives of a draft too great to permit it to use Anchorage F desires to anchor. When Anchorage F–1 is occupied by a vessel carrying explosives, vessels shall not anchor in Anchorages B and C within 425 yards of Anchorage F–1. No vessel carrying explosives shall be anchored in Anchorage F–1 so as to swing within 500 yards of the Newport News Channel.

(v) Vessels carrying explosives or other dangerous cargo, including inflammable liquids, inflammable solids, oxidizing materials, corrosive liquids, compressed gases, and poisonous substances, shall be within Anchorage F or F–1 when anchored, except as provided in subdivision (x) of this subparagraph. Anchorage F is reserved for this special purpose and shall not be used by vessels carrying other classes of cargo except in cases of great emergency or by special permit from the Captain of the Port.

(vi) A written permit shall be obtained from the Captain of the Port before a vessel carrying explosives, or on which explosives are to be loaded, may proceed to an explosives anchorage; and no vessel shall occupy a berth in such an anchorage except by authority of such a permit which may be revoked at any time.

(vii) Vessels used in connection with loading or unloading explosives in anchorage areas, including tugs and stevedore boats, shall carry a written permit from the Captain of the Port. Such permits shall be shown whenever required by him or by his properly authorized agents.

(viii) Whenever any vessel not mechanically self-propelled anchors in an explosives anchorage while carrying explosives, the Captain of the Port may require the attendance of a tug upon such vessel when in his judgment such action is necessary.

(ix) Vessels carrying explosives shall comply with the general regulations in paragraph (h) of this section when applicable.

(x) The District Engineer, Corps of Engineers, may authorize a vessel carrying explosives for use on river and harbor works or on other work under permit issued by the District Engineer to anchor in or near the vicinity of such work without a permit from the Captain of the Port. The District Engineer will prescribe the quantities of such explosives allowed on such vessel and the conditions under which they are to be stored and handled, and will furnish the Captain of the Port with a copy of such instructions.

(8)–(12) (Reserved)

(13) Anchorage for construction equipment, T-6. Anchorage T-6 is a circular area of radius 300 yards whose center is located at latitude 36°54′16″N., longitude 76°20′40″W. This anchorage is for the exclusive use of floating equipment used in the construction of Pier 25 at the Naval Station, Norfolk, Virginia.

(b) James River–(1) Anchorage G. Beginning at the mouth of the river opposite Newport News, east of a line running from Barrel Point, latitude 36°54′53″ longitude 76°28′51″; thence across the mouth of Batten Bay to Candy Island, latitude 36°56′18″, longitude 76°29′05″; and shoreward of a line beginning at Fishing Point, latitude 36°57′50″, longitude 76°29′38″; thence to latitude 36°59′08″, longitude 76°27′56″; thence to latitude 36°58′37″, longitude 76°26′41″; thence to latitude 36°57′50″, longitude 76°26′04″; thence to latitude 36°57′32.1″, longitude 76°25′40″; thence to latitude 36°57′09.8″, longitude 76°24′51.9″; thence to latitude 36°56′44″, longitude 76°24′18.5″; thence to latitude 36°56′44″, longitude 76°25′05.7″; thence to latitude 36°55′52.5″, longitude 76°25′09.5″; thence to latitude 36°54′00″, longitude 76°28′59″.

(2) Anchorage G–1. On the northeast side of the river downstream from the James River Bridge, and shoreward of a line described as follows: Beginning at latitude 36°59′41″, longitude 76°26′40″; thence to latitude 37°00′15″, longitude 76°27′52″; and thence to latitude 37°00′45″, longitude 76°27′17″.

(3) Anchorage G–2. On the northeast side of the river upstream from the James River Bridge, and shoreward of a line described as follows: Beginning at latitude 37°00′58″, longitude 76°27′23″; thence to latitude 37°00′24″, longitude 76°28′06″; thence to latitude 37°01′55″, longitude 76°31′19″; and thence to latitude 37°03′06″, longitude 76°30′29″.

(c) East of Norfolk Harbor Channel–

(1) Anchorage K–1. Shoreward of a line described as follows: Beginning at the shoreward end of the jetty north of Army Base Pier No. 2, latitude 36°55′13″, longitude 76°19′42″; thence along the jetty to latitude 36°55′14″, longitude 76°19′46.5″; thence along the jetty to latitude 36°55′10″, longitude 76°19′49.5″; thence to a point on the east side of Norfolk Harbor Channel at latitude 36°55′06″, longitude 76°20′22″; thence northerly along the east side of Norfolk Harbor Channel to latitude 36°55′36.5″, longitude 76°20′20″; and thence to latitude 36°55′38″, longitude 76°19′47″,

(2) Anchorage K–2. Except for the waters within the marked, dredged channel which enters the Lafayette River, on the east side of Norfolk Harbor Reach and Craney Island Reach at the mouth of the Lafayette River, and within the boundaries described as follows: Starting at Tanner Point, latitude 36°54′13″N., longitude 76°19′25″W.; across the mouth of the Lafayette River to Boushs Bluff, latitude 36°54′14″N., longitude 76°18′43″W.; thence southerly along the shore to latitude 36°52′58.8″N., longitude 76°19′24.6″W.; thence to a point on the east side of the dredged area alongside Craney Island Reach at latitude 36°53′04.5″N., longitude 76°19′58.5″W.; thence northerly along the side of the dredged area to latitude 36°53′27″N., longitude 76°20′02″W.; thence northerly along the side of the dredged area to latitude 36°53′31″N., longitude 76°20′06″W.; thence northerly along the east side of Craney Island Reach and Norfolk Harbor Reach to latitude 36°54′46″N., longitude 76°20′14.6″W.; thence southeasterly to latitude 36°54′35″N., longitude 76°19′46.7″W.; thence south to latitude 36°54′25″N., longitude 76°19′46.7″W.; thence east to latitude 36°54′25″N., longitude 76°19′34″W.; thence along the shore to the point of beginning.

(3) Anchorage K–3 (for yachts and pleasure craft). That part of Lafayette River upstream from Anchorage K–2 and downstream from a line crossing the river below the Hampton Boulevard bridge from latitude 36°54′27.5″, longitude 76°18′22.5″, to latitude 36°54′11″, longitude 76°18′18″.

(i) Anchorage is prohibited in the dredged channel in Lafayette River.

(d) Elizabeth River–(1) Anchorage H-1, West Norfolk. The water area on the west side of Norfolk Harbor Channel, south of Craney Island enclosed by a line beginning at a point on the western edge of the Norfolk Harbor Channel at latitude 36°52′41″N., longitude 76°20′07″W.; thence westerly to latitude 36°52′39.5″N., longitude 76°20′37.8″W.; then southerly to latitude 36°52′18.8″N., longitude 76°20′34.3″W.; thence easterly to latitude 36°52′22.2″N., longitude 76°20′03.8″W.; thence northerly along the western boundary of the Norfolk Harbor Channel to the point of beginning.

(i) No vessel shall remain anchored in this anchorage awaiting loading for a period longer than 48 hours, except when non-availability of loading facilities, inclement weather, ice conditions, or other conditions reasonably require a longer period in awaiting turn for docking.

(ii) No vessel after receiving its load shall remain more than 12 daylight hours in this anchorage, i. e., vessels loaded during the afternoon or night shall clear the anchorage prior to the hour of darkness of the following day.

(2) Anchorage L. On the northeast side of Elizabeth River, south of Lambert Point, and shoreward of a line described as follows: Beginning at latitude 36°52′06.5″, longitude 76°19′04.5″; thence to latitude 36°51′56.5″, longitude 76°19′20″; thence to latitude 36°52′13″, longitude 76°19′44.5″; and thence to latitude 36°52′21″, longitude 76°19′34″.

(3) Anchorage M. On the northeast side of Elizabeth River, opposite Pinner Point, and shoreward of a line described as follows: Beginning at latitude 36°51′29.5″, longitude 76°18′37″; thence to latitude 36°51′32″, longitude 76°18′45.5″; thence to latitude 36°51′42″, longitude 76°19′00″; and thence to latitude 36°51′52″, longitude 76°18′47.5″.

(4) Anchorage N–1, Smith Creek (for yachts and pleasure craft)–(i) Mowbray Arch. Between Mowbray Arch and a line described as follows: Beginning at Ghent Bridge 150 feet from Mowbray Arch and continuing westerly the same distance therefrom to the intersection of the prolongation of the east side of Colonial Avenue; thence in a straight line to a point on the south side of Mill Street prolonged and 70 feet from Mowbray Arch; thence parallel to and 70 feet from Mowbray Arch to the south side of Pembroke Avenue prolonged; thence along the prolongation of the south side of Pembroke Avenue to a point 50 feet from Mowbray Arch; and thence in a straight line to a point on the south side of Fairfax Avenue prolonged and 40 feet from Mowbray Arch.

(ii) The Hague. Between the wall on the west side of the Hague and a straight line joining a point 40 feet easterly thereof in the south side of Fairfax Avenue prolonged with a point 70 feet easterly from the wall in a line perpendicular to the wall at the south end thereof.

(iii) No floats, rafts, lighters, houseboats, or other craft laid up for any reason shall be permitted within these anchorages, except by permission of the Captain of the Port.

(iv) No vessel shall anchor or moor alongside any wharf or pier in Smith Creek so as to extend more than 40 feet beyond the pierhead line except in the authorized anchorages.

(5) Anchorage O, Hospital Point. On the southwest side of the Elizabeth River, adjacent to the Portsmouth Naval Hospital, and shoreward of a line described as follows:

Beginning on the shore at latitude 36°50′55.3″N., longitude 76°18′43″W., thence to latitude 36°50′57″N., longitude 76°18′43″W.; thence to latitude 36°51′05″N., longitude 76°18′23″W.; thence to latitude 36°50′49.5″N., longitude 76°18′00″W.; thence to latitude 36°50′36.7″N., longitude 76°17′52.8″W.; thence to latitude 36°50′27.8″N., longitude 76°18′09.5″W.; thence to the shore at latitude 36°50′25.7″N., longitude 76°18′09.5″W.

(6) Anchorage P, Port Norfolk. On the southwest side of Elizabeth River, between Pinner Point and Western Branch Channel, and shoreward of a line described as follows: Beginning at latitude 36°51′25″, longitude 76°19′59″; thence to latitude 36°51′44.5″, longitude 76°19′47″; thence to a point on the southwest side of Norfolk Harbor Channel at latitude 36°52′01″, longitude 76°19′42.5″; thence southeasterly along the side of the channel to latitude 36°51′32″, longitude 76°19′01″; and thence to latitude 36°51′18″, longitude 76°19′16″.

(e) Eastern Branch of Elizabeth River–(1) Anchorage Q, Berkley. South of the channel, shoreward of a line described as follows: Beginning at latitude 36°50′20″, longitude 76°17′12.5″; thence to latitude 36°50′24″, longitude 76°17′14.5″; thence to latitude 36°50′22.5″, longitude 76°16′58.5″; and thence to latitude 36°50′13″, longitude 76°16′59″.

(2) Anchorage S–(i) Section 1. On the north side of the river, upstream from the Virginian Railway bridge, and shoreward of a line described as follows: Beginning at latitude 36°50′23″, longitude 76°14′18″; thence to latitude 36°50′18.5″, longitude 76°14′18″; thence to latitude 36°50′14″, longitude 76°14′35″; and thence to latitude 36°50′19.5″, longitude 76°14′33″.

(ii) Section 2. On the north side of the Eastern Branch, below the mouth of Broad Creek, and shoreward of a line described as follows: Beginning at latitude 36°50′22.5″, longitude 76°13′50″; thence to latitude 36°50′19.5″, longitude 76°14′12.5″; and thence to latitude 36°50′24″, longitude 76°14′13″.

(iii) Anchorage is prohibited within 200 feet of permanent improvements.

(f) Willoughby Bay–(1) Anchorage J–1 (for yachts and pleasure craft). East of the west end of Willoughby Spit, shoreward of a line running from latitude 36°57′54″, longitude 76°17′46″, to latitude 36°57′50.5″, longitude 76°17′49″.

(2) Anchorage J–2 (for yachts and pleasure craft). South of Willoughby Spit, shoreward of a line described as follows: Beginning at latitude 36°57′42″, longitude 76°16′21.5″; thence to latitude 36°57′44.5″, longitude 76°17′27″; thence to latitude 36°57′48″, longitude 76°17′43″; and thence to latitude 36°57′55.5″, longitude 76°17′44″.

(g) Lower Chesapeake Bay south of Thimble Shoal Channel–(1) Anchorage L-A (naval). Between Cape Henry and Little Creek, beginning at latitude 36°57′11.0″, longitude 76°03′03.0″; thence to latitude 36°55′41.0″, longitude 76°03′14.5″; thence to latitude 36°56′22.0″, longitude 76°05′53.5″; thence to latitude 36°57′01.5″, longitude 76°05′59.0″; thence to latitude 36°57′57.0″, longitude 76°09′35.0″; thence to latitude 36°58′47.0″, longitude 76°09′08.5″; thence to the point of beginning.

(i) This anchorage is reserved primarily for the use of naval vessels, but in the absence of the fleet the Captain of the Port may, in his discretion, permit it to be used by merchant vessels. Movement of vessels through the area will not be restricted.

(2) Anchorage L-C. Northwest of Anchorage L-A, beginning at latitude 36°59′14″, longitude 76°10′56.5″; thence to latitude 36°58′18.3″, longitude 76°10′54″; thence to latitude 36°58′59″, longitude 76°13′32.5″; thence to latitude 36°59′56″, longitude 76°13′36.3″; thence to the point of beginning.

(i) This anchorage is primarily for the use of merchant vessels but the Captain of the Port may, in his discretion, permit it to be used by naval vessels, the commercial conditions at the time being given due consideration. No vessels shall occupy any berth in this anchorage without first obtaining permission from the Captain of the Port.

(3) Anchorage L-E (for naval amphibious craft). Southwest of Anchorage L-A, east of the Little Creek thorofare, and shoreward of a line described as follows: Beginning at Little Creek Harbor Jetty Light 1 (approximately latitude 36°55′57.0″, longitude 76°10′36.0″); thence to latitude 36°58′04.0″, longitude 76°10′02.0″; thence to latitude

36°57′31.5″, longitude 76°07′55.0″; thence to latitude 36°55′25.0″, longitude 76°08′28.5″.

(i) This anchorage is reserved for the exclusive use of naval vessels and, except in case of emergency, no other vessel shall anchor therein without permission from local naval authorities, obtained through the Captain of the Port, Norfolk, Virginia. Movement of vessels through the anchorage will not be restricted.

(h) General regulations. (1) Except in cases of great emergency, no vessel shall be anchored in Hampton Roads or adjacent waters outside of the anchorage areas established in this section or within a cable or pipe line area shown on a Government chart, nor be moored, anchored, or tied up to any pier, wharf or other vessel in such manner as to obstruct or endanger the passage of any vessel.

(2) No vessel shall occupy for a longer period than 30 days, unless a permit is obtained from the Captain of the Port for that purpose, any anchorage for which the time of occupancy is not otherwise prescribed in this section. No vessel in a condition such that it is likely to sink or otherwise become a menace or obstruction to navigation or anchorage of other vessels shall occupy an anchorage except in an emergency, and then only for such period as may be permitted by the Captain of the Port.

(3) Whenever, in the opinion of the Captain of the Port, such action may be necessary, that officer may require any or all vessels in any designated anchorage area to moor with two or more anchors.

(4) Every vessel whose crew may be reduced to such number that it will not have sufficient men on board to weigh anchor at any time shall, before release or reduction of the crew, be anchored with two anchors with mooring swivel unless the Captain of the Port shall waive the requirement of a mooring swivel.

(5) Anchors shall be placed well within the anchorage areas, so that no portion of the hull or rigging will at any time extend outside the boundaries of the anchorage area.

(6) Any vessel anchoring under circumstances of great emergency outside an anchorage area shall 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 other vessel, and shall move away immediately after the emergency ceases, or upon notification by the Captain of the Port.

(7) Upon application, a berth in an anchorage, if available, will be assigned to any vessel by the Captain of the Port. He may grant revocable permits for the habitual use of the same berth, and no vessel shall occupy a berth habitually except under authority of such a permit.

(8) Upon approval of the District Engineer, Corps of Engineers, the Captain of the Port may permit wrecking plant or other vessels legally engaged in recovering sunken property or in laying or repairing legally established pipe lines or cables, or plant engaged in dredging operations, to anchor in channels. Such permission is not necessary for plant engage upon works of river and harbor improvement under the supervision of the District Engineer, but the District Engineer will notify the Captain of the Port in advance of all such proposed work.

(9) Whenever the maritime or commercial interests of the United States so require, the Captain of the Port is hereby empowered to shift the position of any vessel anchored or moored within or outside an anchorage area, including any vessel which is so moored or anchored as to obstruct navigation or interfere with range lights.

(10) A vessel upon being notified to shift its position shall get under way at once or signal for a tug and shall change position as directed with reasonable promptness.

(11) Nothing in this section shall be construed as relieving any vessel or the owner or person in charge of any vessel from the penalties of law for obstructing navigation or for obstructing or interfering with range lights, or for not complying with the laws relating to lights and fog signals or other navigation laws.

Part 117–Drawbridge Operation Regulations

Subpart A–General Requirements

§117.1 Purpose.

This subpart prescribes general requirements relating to the use and operation of drawbridges across the navigable waters of the United States.

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.

§117.3 Applicability.

The provisions of this subpart not in conflict with the provisions of Subpart B apply to each drawbridge.

Note.–For all of the requirements applicable to a drawbridge 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.

§117.5 When the draw shall open.

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.

§117.7 General duties of drawbridge owners and tenders.

(a) Drawbridge owners and tenders shall operate the draw in accordance with the requirement in this part.

(b) Except for drawbridges not required to open for the passage of vessels, owners of drawbridges shall ensure that:

(1) The necessary drawtenders are provided for the safe and prompt opening of the draw;

(2) The operating machinery of the draw is maintained in a serviceable condition; and

(3) The draws are operated at sufficient intervals to assure their satisfactory operation.

§117.9 Delaying opening of a draw.

No person shall unreasonably delay the opening of a draw after the signals required by §117.15 have been given.

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.

§117.11 Appurtenances unessential to navigation.

No vessel owner or operator shall signal a drawbridge to open for any nonstructural vessel appurtenance which is not essential to navigation or which is easily lowered.

§117.15 Signals.

(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.

(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.

(3) Any of the means of signaling described in this subpart sufficient to alert the bridge being signaled may be used.

(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.

(2) As used in this section, "prolonged" means a blast of four to six seconds duration and "short blast" means a blast of approximately one second duration.

(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.

(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 than 30 seconds after the requesting signal.

(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.

(c) Visual signals. (1) The visual signal to request the opening of a draw is–

(i) A white flag raised and lowered vertically; or

(ii) A white, amber, or green light raised and lowered vertically.

(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–

(i) A white flag raised and lowered vertically;

(ii) A white, amber, or green light raised and lowered vertically, or

(iii) A fixed or flashing white, amber, or green light or lights.

(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–

(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

(ii) A fixed flashing red light or lights given not more than 30 seconds after the vessel's opening signal.

(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.

(d) Radiotelephone communications. (1) Radiotelephones may be used to communicate the same information provided by sound and visual signals.

NOTE: Call signs and radio channels for drawbridges equipped with radiotelephones are included with the bridge descriptions in chapters 4 through 15.

(2) The vessel and the drawtender shall monitor the frequency used until the vessel has cleared the draw.

(3) When radiotelephone contact cannot be initiated or maintained, sound or visual signals under this section shall be used.

§117.17 Signalling for contiguous drawbridges.

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.

§117.19 Signalling when two or more vessels are approaching a drawbridge.

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 during a scheduled open period.

§117.21 Signalling for an opened drawbridge.

When a vessel approaches a drawbridge with the draw in the open position, the vessel shall give the opening signal. If no acknowledgment is received within 30 seconds, the vessel may proceed, with caution, through the open draw.

§117.23 Installation of radiotelephones.

(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.

(b) The District Commander gives written notice of the proposed requirement to the bridge owner.

(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.

(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 be installed and gives a reasonable time, not to exceed six months, to install the radiotelephone and commence operation.

§117.24 Radiotelephone installation identification.

(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.

(b) The sign shall give notice of the radiotelephone and its calling and working channels–

(1) In plain language; or

(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 working channel should be shown in the lower right quadrant.

§117.31 Closure of draw for emergency vehicles.

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.

§117.33 Closure of draw for natural disasters or civil disorders.

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.

§117.35 Operations during repair or maintenance.

(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.

(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.

(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.

(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.

§117.37 Opening or closure of draw for public interest concerns.

(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.

(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.

(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.

§117.39 Closure of draw due to infrequent use.

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.

§117.41 Maintenance of draw in fully open position.

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.

§117.43 Changes in draw operation requirements for regulatory purposes.

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 60 days. Notice of these deviations is disseminated in the Local Notices to Mariners and published in the Federal Register.

§117.45 Operation during winter in the Great Lakes area.

(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.

(b) Notice of these determinations is disseminted in Local Notices to Mariners and other appropriate media. Notices indicate–

(1) The name and location of the bridge affected;

(2) The period of time covered; and

(3) The telephone number and address of the party to whom requests for openings are given.

§117.47 Clearance gages.

(a) Clearance gages 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.

(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).

Note.–Clearance gage requirements, if any, for drawbridges other than those referred to in this section are listed in Subpart B under the appropriate bridge.

§117.49 Process of violations.

(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.

(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

§117.51 Purpose.

This subpart prescribes specific requirements relating to the operation of certain drawbridges.

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.

§117.53 Applicability.

(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.

(b) A requirement in this subpart which varies from a general requirement in Subpart A supersedes the general requirement.

(c) All other general requirements in Subpart A not at variance apply to the bridges listed in this subpart.

(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.

§117.55 Posting of requirements.

(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.

(b) The signs shall be of sufficient size and so located as to be easily read at any time from an approaching vessel.

(c) If notice is required to open the draw, the signs shall also state the name, address, and telephone number of the person to be notified.

§117.57 Advance notice.

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.

§117.59 Special requirements due to hazards.

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.

DELAWARE

§117.231 Brandywine Creek.

The draw of the Conrail bridge, mile 1.1, the Church Street bridge, mile 1.3, and the Sixteenth Street bridge, mile 1.7, all at Wilmington, need not be opened for the passage of vessels.

§117.233 Broad Creek.

The draws of the Conrail bridge, mile 8.0, the Poplar Street bridge, mile 8.2, and the US13A bridge, mile 8.2, all at Laurel, shall open on signal if at least four hours notice is given.

§117.235 Chesapeake and Delaware Canal.

The draw of the Conrail bridge, mile 7.7, shall open on signal. The following light signals, located in the center of the drawspan on both sides of the bridge, shall be used:

(a) When the draw is to be opened immediately, one fixed amber light.

(b) When the draw is not ready to be opened, one flashing red light.

§117.237 Christina River.

(a) The owners of the bridges on this waterway:

(1) 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 so placed on the bridges that they are plainly visible to the operator of each vessel approaching the bridges either up or downstream.

(2) Shall open on signal except that the draw of a railroad bridge need not be opened when a train is in the bridge block, approaching the bridge, or within 5 minutes of the passage of a passenger train; but in no event shall the opening of the draw be delayed more than 10 minutes.

(b) The draw of the Third Street Bridge, mile 2.3 and Walnut Street bridge, mile 2.8, both at Wilmington shall open on signal. The draw of the Market Street Bridge, mile 3.0 at Wilmington shall open on signal if at least eight hours notice is given. From 7 a.m. to 8 a.m. and 4:30 p.m. to 5:30 p.m., Monday through Saturday except holidays, the draws of these three bridges need not be opened for the passage of vessels. Any vessel which has passed through one or more of these bridges immediately prior to a closed period and which requires passage through the other bridge or bridges in order to continue to its destination shall be passed through the draw or draws of the bridge or bridges without delay. The draws of these bridges shall open at all times as soon as possible for passage of a public vessel of the United States.

(c) The draws of the Conrail bridges, at miles 4.1 and 4.2, both at Wilmington, shall open on signal from 6 a.m. to 8 p.m. if at least 24 hours notice is given. From 8 p.m. to 6 a.m., the draws need not be opened for the passage of vessels.

(d) The draw of the SH141 bridge, mile 7.5 at Wilmington, shall open on signal if at least 24 hours notice is given.

§117.239 Lewes and Rehoboth Canal.

The draws of the Delaware highway bridges, mile 2.0 and 7.0, both at Rehoboth, shall open on signal from May 1 through October 31 from 7 a.m. to 8 p.m. and from 8 p.m. to 7 a.m. if at least two hours notice is given. From November 1 through April 30, the draws shall open on signal if at least 24 hours notice is given.

§117.241 Mispillion River.

The draws of the S14 bridge, mile 11.0 at Milford, shall open on signal if at least two hours notice is given.

§117.243 Nanticoke River.

The draw of the Conrail bridge, mile 39.4 at Seaford, shall open on signal from May 1 through September 30 from 8 a.m. to 8 p.m. and need not be opened from 8 p.m. to 8 a.m. At all times from October 1 through April 30, the draw shall open on signal if at least four hours notice is given.

§117.245 Smyrna River.

The draw of the Delaware highway bridge, mile 4.0 at Flemings Landing, shall open on signal if at least 24 hours notice is given.

§117.247 St. Jones River.

The draw of the Delaware highway bridge, mile 4.5 at Barkers Landing, shall open on signal if at least 24 hours notice is given.

DISTRICT OF COLUMBIA

§117.253 Anacostia River.

(a) The draw of the Frederick Douglass Memorial (South Capitol Street) bridge, mile 1.2, shall open on signal if at least 24 hours notice is given. The draw is closed to the passage of vessels on each Presidential Inauguration Day and may occasionally be closed without advance notice to permit uninterrupted transit of dignitaries across the bridge.

(b) The draw of the Conrail bridge, mile 3.4, shall be operated as follows:

(1) The draw shall open on signal on Saturdays, Sundays, and Federal holidays and on weekdays from 10 a.m. to 8 p.m. from April 1 through September 30.

(2) The draw shall open on signal on the hour from April 1 through September 30 Monday through Friday except Federal holidays from 8 p.m. to 10 a.m., and from October 1 through March 31 on Saturdays, Sundays, and Federal holidays from 10 a.m. to 6 p.m.

(3) At all other times, the draw shall open on signal if at least two hours notice is given.

(4) Public vessels of the United States and vessels of Maryland or the District of Columbia used for public safety shall be passed as soon as possible.

(5) 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 so placed on the bridge that they are plainly visible to the operator of each vessel approaching the bridge either up or downstream.

§117.255 Potomac River

(a) The draw of the Woodrow Wilson Memorial (I-95) bridge, mile 103.8 at Alexandria, shall open on signal; except that, from 6:30 a.m. to 9 a.m. and 4 p.m. to 6:30 p.m. Monday through Friday except Federal holidays, the draw need not be opened for the passage of vessels. The following vessels shall be passed at any time:

(1) Public vessels owned or operated by the United States.

(2) Vessels in distress.

(3) Vessels engaged exclusively in the tourist trade on the Potomac River which operate from Washington, D.C., when the vertical clearance under the draw is less than 50 feet.

(b) The draws of all other bridges need not be opened for the passage of vessels.

MARYLAND

§117.541 Baltimore Harbor-Patapsco River.

(a) The draw of the Hanover Street S2 bridge, mile 12.0 across the Middle Branch of the Patapsco River at Baltimore, shall open on signal from 5 a.m. to 6:30 a.m., 9:30 a.m. to 4 p.m., and 6 p.m. to 9:00 p.m. The draw need not be opened from 6:30 a.m. to 9:30 a.m. and 4 p.m. to 6 p.m.; however, fire boats, police boats, and other vessels engaged in emergency operatons shall be passed immediately during this period. When a vessel desires to pass the draw from 9 p.m. to 5 a.m., notice shall be given to the superintendent of the bridge, either at the bridge before 9 p.m. or at the superintendent's residence after 9 p.m. If the notice is given from 5 a.m. to 9 p.m. or if at least one half hour has elapsed since the notice was given, the draw shall open promptly at the time requested.

(b) The draw of the Western Maryland railroad bridge, mile 12.5 across the Middle Branch of the Patapsco River at Baltimore, shall open on signal from 7 a.m. to 12 noon and 1 p.m. to 4 p.m. Monday through Friday except legal holidays. At all other times, the draw shall open if at least six hours notice is given. Marine firefighting equipment and pollution control vessels shall be passed as soon as possible but in no event more than 15 minutes after notice is given.

§117.543 Bear Creek.

(a) The draws of the Baltimore County Revenue Authority (Dundalk Avenue) highway toll bridge, mile 1.5, and the Peninsula Parkway bridge, mile 2.1, both between Dundalk and Sparrows Point, shall open on signal; except that, from April 16 through November 15 from 12 midnight to 8 a.m. except Saturdays, Sundays, and Federal and State holidays, at least one half hour notice is required.

(b) The draw of the Baltimore County highway bridge, mile 3.4 at Wise Avenue between Dundalk and Sparrows Point, shall open on signal if at least four ours notice is given.

§117.545 Bohemia River.

(a) The draw of the S213 bridge, mile 4.0 at Cayots, shall open on signal from May 30 through September 30 on Saturdays, Sundays, and Federal and State holidays; from May 30 through September 30, Monday through Friday; and from October 1 through May 29 from 7 a.m. Monday through 7 p.m. Friday if at least three hours notice is given. From October 1 through May 29 from 7 p.m. Friday through 7 a.m. Monday, the draw need not be opened unless the request is made before 7 p.m. Friday.

§117.547 Bush River.

The draw of the Amtrak bridge, mile 6.8 at Perryman, shall open on signal twice on Saturdays and twice on Sundays from 10 a.m. to 5 p.m. from June 1 through September 30 if at least 24 hours notice is given to the Bush River Boat Club. The draw need not be opened at all other times.

§117.549 Cambridge Harbor.

The draw of the S342 bridge, mile 0.1 at Cambridge, shall open on signal from 6 a.m. to 8 p.m.; except that, from 12 noon to 1 p.m. Monday through Friday, the draw need not be opened. The draw need not be opened from 8 p.m. to 6 a.m.

§117.551 Chester River.

The draw of the S213 bridge, mile 26.8 at Chestertown, shall open on signal from April 1 through September 30 from 6 a.m. to 6 p.m. At all other times, the draw shall open on signal if at least six hours notice is given.

§117.553 Choptank River.

The draw of the Conrail bridge, mile 50.9 at Denton, shall open on signal from May 30 through September 30 from sunrise to sunset and at all other times if at least four hours notice is given.

§117.555 College Creek.

The draws of the Naval Academy highway bridge, mile 0.3 at Annapolis, and the Maryland highway bridge, mile 0.4 at Annapolis, need not be opened for the passage of vessels.

§117.557 Curtis Creek.

The draw of the I695 bridge, mile 0.9 at Baltimore, shall open on signal if at least a one-hour notice is given to the Maryland Transportation Authority in Baltimore.

§117.559 Isle of Wight Bay.

The draw of the US50 bridge, mile 0.5 at Ocean City, shall open on signal; except that, from October 1 through April 30 from 6 p.m. to 6 a.m., the draw shall open if at least three hours notice is given and, from May 25 through September 15 from 9:25 a.m. to 9:55 p.m., the draw shall open at 25 minutes after and 55 minutes after the hour for a maximum of five minutes to permit accumulated vessels to pass.

§117.561 Kent Island Narrows.

The draw of the US301 bridge, mile 1.0 at Kent Island Narrows, operates as follows:

(a) From November 1 through April 30, the draw shall open on signal from 6 a.m. to 6 p.m. but need not be opened from 6 p.m. to 6 a.m.

(b) From May 1 through October 31–

(1) On Monday (except Monday holidays) through Thursday, the draw shall open on signal on the hours from 7 a.m. to 7 p.m. but need not be opened at any other time.

(2) On Friday, the draw shall open on signal on the hour from 6 a.m. to 3 p.m. and at 8 p.m. but need not be opened at any other time.

(3) On Saturday, the draw shall open on signal at 6 a.m., 9 a.m., and 12 noon and on the hour from 3 p.m. to 8 p.m. but need not be opened at any other time.

(4) On Sunday and holidays falling on Monday, the draw shall open on signal on the hour from 6 a.m. to 1 p.m. and at 8 p.m. but need not be opened at any other time.

(5) The draw shall open at scheduled opening times only if vessels are waiting to pass. At each opening, the draw shall remain open for a sufficient period of time to allow passage of all waiting vessels.

(6) If a vessel is approaching the bridge and cannot reach the bridge exactly on the hour, the drawtender may delay the hourly opening up to ten minutes past the hour for the passage of the approaching vessel and any other vessels that are waiting to pass.

(c) All public vessels of the United States and State or local vessels on public safety missions shall be passed at any time. The opening signal for these vessels is five or more blasts of a whistle or horn.

§117.563 Marshyhope Creek.

The draw of the S14 bridge, mile 5.8 at Brookview, need not be opened for the passage of vessels. The operating machinery shall be maintained in a serviceable condition.

§117.565 Miles River.

The draw of the S370 bridge, mile 10.0 at Easton, shall open on signal from sunrise to sunset. A vessel wishing to pass through the draw between sunset and sunrise shall notify the drawtender of the time at which it is desired to pass and the draw shall open as close to the time requested as practicable.

§117.567 Patuxent River.

The draw of S231 bridge, mile 18.5 at Benedict, shall open on signal; except that, from 6 p.m. to 6 a.m., the draw shall open on signal if notice is given to the Toll Captain at the Administration Building at the east end of the bridge before 6 p.m.

§117.569 Pocomoke River.

(1) The draw of the US13 bridge, mile 15.6 at Pocomoke City, shall open on signal, except that the draw need not open from 10 p.m. to 6 a.m.

(b) The draw of the S12 bridge, mile 29.9 at Snow Hill, shall open on signal if at least five hours notice is given.

§117.571 Spa Creek.

The draw of the S181 bridge, mile 0.4 at Annapolis, shall open on signal; except that, from 7:30 a.m. to 9 a.m. and 4:30 p.m. to 6 p.m. Monday through Friday except Federal and State holidays, the draw need not be opened for the passage of vessels and, from May 1 through November 1 from 10 a.m. to 5 p.m. on Saturdays and Sundays, the draw need not be opened except on the hour and half hour if any vessels are waiting to pass. Public vessels of the United States and vessels in an emergency involving danger to life or property shall be passed at any time.

§117.573 Stoney Creek.

The draw of the S173 bridge, mile 0.9 at Riviera Beach, shall open on signal; except that, from 6:30 a.m. to 9 a.m. and from 4 p.m. to 6 p.m. Monday through Friday except Federal and State holidays, the draw need be opened only at 7:30 a.m. and 5 p.m. if any vessels are waiting to pass. Public vessels of the United States and vessels in an emergency involving danger to life or property shall be passed at any time.

§117.575 Susquehanna River.

The draw of the Conrail bridge, mile 1.0 at Havre de Grace, shall open on signal if at least 24 hours notice is given.

§117.577 Weems Creek.

The draw of the S437 bridge, mile 0.7 at West Annapolis, shall open on signal from sunrise to sunset from May 1 through September 30. At all other times, the draw shall open on signal if at least five hours notice is given.

§117.579 Wicomico River (North Prong).

The draw of the Main Street (US50) bridge, mile 22.4 at Salisbury, shall open on signal; except that, from 8 a.m. to 9 a.m., 12 noon to 1 p.m., and 4:30 p.m. to 5:30 p.m., the draw need not be opened for the passage of vessels.

NEW JERSEY

§117.701 Alloway Creek.

(a) The draws of the Salem County bridges, miles 5.1 at Hancocks Bridge, and 6.5 at New Bridge, shall open on signal if at least 24 hours notice is given.

(b) The draw of the S49 bridge, mile 9.5 at Quinton, need not be opened for the passage of vessels.

§117.703 Bass River.

The draw of the US9 bridge, mile 2.6 at New Gretna, shall open on signal from March 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 six hours notice is given.

§117.705 Beaver Dam Creek.

The draw of the Ocean County bridge, mile 0.5 at Point Pleasant, shall open on signal from June 1 through September 30 and from 8 a.m. to 4 p.m. during April, May, October, and November. At all other times, the draw shall open on signal if at least 24 hours notice is given.

§117.711 Cohansey River.

The draw of the Broad Street bridge, mile 18.2 at Bridgeton, need not be opened for the passage of vessels.

§117.713 Cooper River.

(1) The draws of the State Street bridge, mile 0.3, the Conrail bridge at North River Avenue, mile 0.9, and the Federal Street bridge, mile 1.0, both at Camden, shall open on signal if at least four hours notice is given.

(b) The draw of the Admiral Wilson Boulevard bridge, mile 1.1 at Camden, need not be opened for the passage of vessels. However, the draw shall be returned to operable condition within six months after notification by the District Commander to do so.

§117.715 Debbies Creek.

The draw of the Monmouth County highway bridge, mile 0.4 at Manasquan, shall open on signal; except that, from Memorial Day though Labor Day from 7 a.m. to 8 p.m., the draw need be opened only on the hour and the half hour if any vessels are waiting to pass. The owners of the bridge shall provide and keep in good legible condition two board gages painted white with black figures not less than eight inches high 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.

§117.716 Delaware River.

The following requirements apply at all drawbridges across the Delaware River:

(a) The draws of railroad bridges need not be opened when there is a train in the bridge block approaching the bridge with the intention of crossing, or within five minutes of the known time of the passage of a scheduled passenger train.

(b) The opening of a bridge may not be delayed more than five minutes for a highway bridge or 10 minutes for a railroad bridge, after the signal to open is given.

(c) The owners of drawbridges 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 so placed on the bridge that they are plainly visible to operators of vessels approaching the bridge either up or downstream.

§117.717 Delaware River (Back Channel).

The draw of the Cities Service Company bridge, mile 117.0 between Petty Island and Camden, need not be opened for the passage of vessels.

§117.725 Manantico Creek.

The draw of the highway bridge, mile 0.5 at Millville, need not be opened for the passage of vessels.

§117.727 Manasquan River.

The draw of the S70 bridge, mile 3.4 at Riviera Beach, shall open on signal from 7 a.m. to 11 p.m. The draw need not be opened from 11 p.m. to 7 a.m.

§117.729 Mantua Creek.

(a) The draw of the CONRAIL railroad bridge, mile 1.4 at Paulsboro, shall open on signal except, that from December 1 to March 1 the draw shall open on signal at all times upon four hours notice.

(b) The draw of the S.R. 44 bridge, mile 1.7, at Paulsboro, shall open on signal from March 1 through November 30 from 7 a.m. to 11 p.m., and shall open on signal at all other times upon four hours notice.

§117.731 Maurice River.

The draw of the Cumberland County bridge, mile 12.1 at Mauricetown, need not be opened for the passage of vessels.

§117.732 Nacote Creek.

The draw of the Atlantic County (Route 575) bridge, mile 3.5 at Port Republic, shall open on signal if at least eight hours notice is given. Public vessels of the United States shall be passed as soon as possible at any time.

§117.733 New Jersey Intracoastal Waterway.

(a) The following requirements apply to all bridges listed in this section:

(1) Except as otherwise provided in this section, these bridges need not stay open for more than 10 minutes for the passage of vessels nor need they stay closed for more than 10 minutes for the passage of land traffic.

(2) The owners of these bridges 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 so placed on the bridge that they are plainly visible to operators of vessels approaching the bridge either up or downstream.

(b) The draw of the Route 35 bridge, mile 1.1 (Manasquan River) at Brielle shall open on signal; except that, from Memorial Day through Labor Day on Saturdays, Sundays, and federal holidays from 10 a.m. to 8 p.m., the draw need only open on the hour and half hour. The draw shall open at all times as soon as possible for passage of a public vessel of the United States, or for a vessel in distress.

(c) The draw of the County Route 528 bridge across Barnegat Bay, mile 6.3 at Mantoloking shall open on signal; except that on Saturday, Sunday, and Federal holidays from Memorial Day through Labor Day from 9 a.m. to 6 p.m., the draw need be opened only on the hour, twenty minutes after the hour, and forty minutes after the hour. The draw shall open at all times as soon as possible for a public vessel of the United States, a vessel in distress, or for a vessel with tow.

(d) The draw of the S37 bridge across Barnegat Bay, mile 14.1 at Seaside Heights, shall open on signal except as follows:

(1) From December 1 through March 31 from 11 p.m. to 7 a.m., the draw need not be opened.

(2) From Memorial Day through Labor Day from 10 a.m. to 2 p.m. Saturdays, Sundays, and Federal holidays, the draw need only be opened on the hour and half hour, except that it shall open at any time for the passage of vessels with tows.

(e) The draws of the New Jersey Transit Rail Operations railroad bridge across Beach Thorofare, mile 68.9 at Atlantic City, shall open on signal from 11 p.m. to 6 a.m. From 6 a.m. to 11 p.m., the draw shall open on signal from 20 minutes to 30 minutes after each hour and remain open for all awaiting vessels.

(f) The draw of the Albany Avenue (US40-322) bridge across Inside Thorofare, mile 70.0 at Atlantic City, shall open on signal, except that from June 1 through September 30 from 9 a.m. to 4 p.m. and from 6 p.m. to 9 p.m., the draw shall open on signal only on the hour and half hour and from 4 p.m. to 6 p.m., the draw need not be opened.

(g) The draw of the Dorset Avenue bridge across Inside Thorofare, Ventnor City, shall open on signal; except that, from June 1 through September 30, 9:15 a.m. to 9:15 p.m., the draw need be opened only on the quarter and three-quarter hours. Public vessels of the United States and vessels in distress shall be passed at any time.

(h) The draw of the Route 52 (Ninth Street) bridge, mile 80.4 at Ocean City, shall open on signal:

(1) Except from Memorial Day through Labor Day from 10 a.m. to 8 p.m. on Saturdays, Sundays, and Federal holidays, the draw must be opened only on the hour and half-hour.

(2) At any time for public vessels of the United States, vessels with another vessel in tow, and vessels in distress.

(i) The draw of the Stone Harbor Boulevard Bridge across Great Channel, mile 102.0 at Stone Harbor, shall open on signal except:

(1) From October 1 through March 31 from 10 p.m. to 6 a.m. the draw need only open if at least eight hours notice is given.

(2) From Memorial Day through Labor Day, from 6 a.m. to 6 p.m. on Saturday, Sunday and holidays, the draw need open only for waiting vessels on the hour, 20 minutes after the hour, and 20 minutes before the hour.

(3) The draw shall be opened at all times as soon as possible for a vessel with a tow, a public vessel of the United States or a vessel in distress.

(j) The draw of the Cape May County Bridge Commission bridge, mile 104.0 between Stone Harbor and Nummy Island, shall open on signal from May 15 through October 15 between 6 a.m. and 10 p.m. and from 10 p.m. to 6 a.m. if at least four hours notice is given. From October 16 through May 14, the draw shall open on signal if at least 24 hours notice is given. Public vessels of the United States shall be passed as soon as possible at any time.

§117.737 Oldmans Creek.

The draws of the US30 bridge, mile 3.1 at Nortonville, the Conrail railroad bridge, mile 4.0 at Jumbo, and the Salem County bridge, mile 5.1 at Pedricktown, need not be opened for the passage of vessels. However, the draws of any of these bridges shall be restored to operable condition within six months after notification by the District Commander to do so.

§117.741 Raccoon Creek.

The draws of the Route 130 highway bridge, mile 1.8 and the CONRAIL railroad bridge, mile 2.0, both at Bridgeport shall open on signal March 1 through November 30 from 7 a.m. to 11 p.m. At all other times, the draws shall open on signal if at least four hours notice is given. The draws shall open at all times as soon as possible for passage of a public vessel of the United States.

§117.745 Rancocas Creek.

The draws of the S543 bridge, mile 1.3 at Riverside, the Conrail bridge, mile 1.6 at Delanco, and the S38 bridge, mile 7.8 at Centerton, shall open on signal from April 1 through November 30 from 7 a.m. to 11 p.m. From December 1 through March 31 from 7 a.m. to 11 p.m., the draw shall open on signal if at least 24 hours notice is given. From 11 p.m. to 7 a.m., the draws need not open for the passage of vessels.

§117.749 Salem River.

The draw of the S49 bridge, mile 3.5 at Salem, shall open on signal if at least 24 hours notice is given.

§117.750 Schellenger Creek.

The draw of the Cape May County bridge, mile 0.3 at Cape May, need not be opened for the passage of vessels.

§117.751 Shark River (South Channel).

The draws of S71 bridge, mile 0.8, the railroad bridge, mile 0.9, and the S35 bridge, mile 0.9, all at Avon, operate as follows:

(a) The bridges operate as one unit. The owners shall provide signal systems so connected that the operator of any

of the bridges may simultaneously notify the operators of the other two. The operator of the first bridge to be passed shall be responsible for observing the approach of vessels, for receiving and acknowledging signals, and for coordinating the opening of the other draws.

(b) The draws shall open on signal; except that, from May 15 through September 30 from 4 p.m. to 7 p.m. Monday through Friday except Federal holidays and from 9 a.m. to 9 p.m. Saturdays, Sundays, and holidays, the draw need be opened only on the hour and half hour if a vessel is waiting to pass.

(c) The owners of the bridges shall provide and keep in good legible condition two board gages painted white with black figures not less than eight inches high to indicate the vertical clearance under the closed draw at all stages of the tide. The gages shall be so placed on the bridges that they are plainly visible to operators of vessels approaching the bridges either up or downstream.

§117.753 Ship Channel, Great Egg Harbor Bay.

The draw of the S52 bridge, mile 0.5 at Ocean City, shall open on signal; except that, from 11 p.m. to 7 a.m., the draw shall open on signal if at least 24 hours notice is given.

§117.757 Tuckahoe River.

The draw of the State highway bridge, mile 8.0 at Tuckahoe, shall open on signal if at least 24 hours notice is given.

§117.759 Wading River.

The draw of the Burlington County highway bridge, mile 5.0 at Wading River, shall open on signal if at least 24 hours notice is given.

PENNSYLVANIA

§117.901 Chester Creek.

The draw of the Front Street bridge, mile 0.1 at Chester, shall open on signal if at least 24 hours notice is given.

§117.903 Darby Creek.

(a) The owners of the bridges on this waterway shall provide and keep in good legible condition two board gages painted white with black figures, nine inches high 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.

(b) The draw of the Conrail railroad bridge, mile 0.3, and the Reading railroad bridge, mile 0.3 both at Easington, shall operate as follows;

(1) From May 15 through October 15:

(i) From 11 p.m. to 7 a.m., the draw need not be opened for the passage of vessels.

(ii) Between 7 a.m. and 11 p.m., the draw shall open on signal at 7:15 a.m., 10:30 a.m., 1 p.m., 3 p.m., 7:30 p.m., and 10:30 p.m. and at all other times during these hours, if an opening will not unduly delay railroad operations.

(2) From October 16 through May 14, the draws shall open on signal if at least 24 hours notice is given.

(3) Any vessel which has passed through one of these bridges shall be passed through the draw of the other bridge without delay. When open for the passage of any vessel, these bridges shall remain open sufficiently long to permit the passage through both bridges of all vessels waiting to pass.

(4) The draws shall open as soon as possible for an emergency or vessel in distress.

§117.904 Delaware River.

The following requirements apply to all drawbridges across the Delaware River:

(a) The draws of railroad bridges need not be opened when there is a train in the bridge block approaching the bridge with the intention of crossing, or within five minutes of the known time of the passage of a scheduled passenger train.

(b) The opening of a bridge may not be delayed more than five minutes for a highway bridge or 10 minutes for a railroad bridge, after the signal to open is given.

(c) The owners of drawbridges 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 so placed on the bridge that they are plainly visible to operators of vessels approaching the bridge either up or downstream.

§117.905 Schuylkill River.

(a) The following requirements apply to all drawbridges across the Schuylkill River:

(1) The draws of railroad bridges need not be opened when there is a train in the bridge block approaching the bridge with the intention of crossing, or within five minutes of the known time of the passage of a scheduled passenger train.

(2) The opening of a bridge may not be delayed more than five minutes for a highway bridge or 10 minutes for a railroad bridge, after the signal to open is given.

(3) The owners of drawbridges 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 so placed on the bridge that they are plainly visible to operators of vessels approaching the bridge either up or downstream.

(b) The Passyunk Avenue bridge, mile 3.5 at Philadelphia, shall open on signal at all times if at least four hours notice is given. Public vessels of the United States shall be passed as soon as possible at any time.

(c) The draw of the Conrail bridge, mile 5.5 at Grays Ferry Avenue, Philadelphia, shall open on signal; except that, on Saturdays and Sundays, the draw shall open on signal if at least two hours notice is given. Public vessels of the United States shall be passed as soon as possible at any time.

(d) The draw of the University Avenue bridge, mile 6.2 at Philadelphia, shall open on signal at all times if at least two hours notice is given. Public vessels of the United States shall be passed as soon as possible at any time.

(e) The draw of the Conrail bridge, mile 6.4 near Christian Street, Philadelphia, shall open on signal if at least two hours notice is given.

VIRGINIA

§117.995 Appomattox River.

The draw of the Seaboard System Railroad bridge, mile 2.5 at Hopewell, shall open on signal if at least 24 hours notice is given to the Seaboard System Agent at Hopewell. However, a drawtender shall be in constant attendance and the draw shall open on signal upon 30 days notice, in writing, to do so from the District Commander.

§117.997 Atlantic Intracoastal Waterway, South Branch of the Elizabeth River to the Albemarle and Chesapeake Canal.

(a) The draw of the Jordan (S337) bridge across the South Branch of the Elizabeth River, mile 2.8 at Portsmouth-Chesapeake, shall open on signal; except that, from 6:30 a.m. to 7:30 a.m. from 3:30 p.m. to 4:30 p.m. Monday through Friday except Federal holidays, the draw need not be opened for the passage of pleasure craft.

(b) The draw of the Norfolk and Western railroad bridge across the South Branch of the Elizabeth River, mile 3.6 at Portsmouth-Chesapeake, shall be maintained in the open position; except the draw may close for the crossing of trains

and maintenance of the bridge. When the draw is closed, a drawtender shall be present and draw shall open on signal.

§117.1001 Cat Point Creek.

The draw of the S634 bridge, mile 0.3 at Naylors, need not be opened for the passage of vessels.

§117.1003 Chickahominy River.

The draw of the highway bridge, mile 1.5 at Barrets Ferry, shall open on signal; except that, from 11 p.m. to 7 a.m., the draw shall open on signal if at least 12 hours notice is given.

§117.1005 Chuckatuck Creek.

The draw of the US17 bridge, mile 1.0 at Crittendon, shall open on signal if at least two hours notice is given. If an emergency exists, the draw shall open as soon as possible.

§117.1007 Elizabeth River-Eastern Branch.

(a) The draw of the Campostella bridge, mile 1.8 at Norfolk, shall open on signal; except that, from 7:35 a.m. to 7:50 a.m. Monday through Friday, the draw need not be opened except for the passage of tugs with tows.

(b) The draw of the Norfolk and Western Railroad bridge, mile 2.7 at Norfolk, shall open on signal; except that, from 10 p.m. to 6 a.m., the draw shall open on signal if at least three hours notice is given.

§117.1011 Great Wicomico River.

The draw of the S200 bridge, mile 8.0 at Tipers, shall open on signal; except that, if an opening is desired from 6 p.m. to 6 a.m., the drawtender on duty shall be notified before 6 p.m..

§117.1013 Kinsale Creek.

The draw of the state highway bridge, mile 4.0, at Kinsale need not be opened for the passage of vessels.

§117.1015 Mattaponi River.

The draws of the Lord Delaware (S33) bridge, mile 0.8 at West Point, and the S629 bridge, mile 28.5 at Walkerton, shall open on signal if at least 24 hours notice is given. The drawtender service for either bridge shall be increased to the degree determined to be adequate within 30 days after written notice is received from the District Commander to do so.

§117.1017 Nansemond River.

The draw of the US 460 bridge, mile 18.2 at Suffolk, shall open on signal if at least 12 hours notice is given.

§117.1019 Nansemond River-Western Branch.

The draw of the S10 bridge, mile 2.0 at Reids Ferry, need not be opened for the passage of vessels.

§117.1021 North Landing River.

The draw of the S165 bridge, mile 20.2 at Chesapeake, shall open on signal; except that, from 6 a.m. to 7 p.m., the draw need be opened only on the hour and half hour for the passage of pleasure craft. Public vessels of the United States, commercial vessels, and vessels in an emergency endangering life or property shall be passed at any time.

Note: Call signs and radio channels for drawbridges equipped with radiotelephones are included with the bridge descriptions in chapters 4 through 15.

Part 160–Ports and Waterways Safety-General

Subpart A–General:

§160.1 Purpose.

Part 160 contains regulations implementing the Ports and Waterways Safety Act (33 U.S.C. 1221) and related statutes.

§160.3 Definitions.

(a) For the purposes of this part:

(1) "Commandant" means the Commandant of the United States Coast Guard.

(2) "District Commander" means the officer of the Coast Guard designated by the Commandant to command a Coast Guard District described in 33 CFR 3.

(3) "Captain of the Port" means the Coast Guard officer commanding a Captain of the Port zone described in 33 CFR 3.

(4) "Person" means an individual, firm, corporation, association, partnership, or governmental entity.

(5) "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.

(6) "Vessel" means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water.

(7) "Vehicle" means every type of conveyance capable of being used as a means of transportation on land.

§160.5 Delegations.

(a) District Commanders and Captains of the Ports are delegated the authority to establish safety zones.

(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.

(c) Under the provisions 33 CFR § 1.05–1, District Commanders have been delegated authority to establish regulated navigation areas.

(d) Under the direction of the Captain of the Port Honolulu, the Commander, Marianas Section, may exercise the authority of a Captain of the Port within the waters surrounding Guam, and the Commonwealth of Marianas, all of which are in the Honolulu Captain of the Port Zone.

§160.7 Appeals.

(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.

(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.

(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 Chief, Office of Marine Environment and Systems, 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 Chief, Office of Marine Environment and Systems. 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 Chief, Office of Marine Environment and Systems. The decision of the Chief, Office of Marine Environment and Systems is based upon the materials submitted, without oral argument or presentation. The decision of the Chief, Office of Marine Environment and Systems is issued in writing and constitutes final agency action.

(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

§160.101 Purpose.

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.

§160.103 Applicability.

(a) This subpart applies to any–

(1) Vessel on the navigable waters of the United States, except as provided in paragraphs (b) and (c) of this section;

(2) Bridge or other structure on or in the navigable waters of the United States; and

(3) Land structure or shore area immediately adjacent to the navigable waters of the United States.

(b) This subpart does not apply to any vessel on the Saint Lawrence Seaway.

(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–

(1) Innocent passage through the territorial sea of the United States;

(2) Transit through the navigable waters of the United States which form a part of an international strait.

§160.105 Compliance with orders.

Each person who has notice of the terms of an order issued under this subpart must comply with that order.

§160.107 Denial of entry.

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.

§160.109 Waterfront facility safety.

(a) To prevent damage to, or destruction of, any bridge or other structure on or in 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–

(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 Section 4417a of the Revised Statutes, as amended, (46 U.S.C. 391a) 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

(2) Conduct examinations to assure compliance with the safety equipment requirements for structures.

§160.111 Special orders applying to vessel operations.

Each District Commander or Captain of the Port may order a vessel to operate or anchor in the manner directed when–

(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;

(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

(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.

§160.113 Prohibition of vessel operation and cargo transfers.

(a) Each District Commander or Captain of the Port may prohibit any vessel subject to the provisions of section 4417a of the Revised Statutes (46 U.S.C. 391a) 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.

(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:

(1) Fails to comply with any applicable regulation;

(2)Discharges oil or hazardous material in violation of any law or treaty of the United States;

(3) Does not comply with applicable vessel traffic service requirements;

(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.

(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.

(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.

§160.115 Withholding of clearance.

(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. 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

§160.201 Applicability and exceptions to applicability

(a) This subpart prescribes notification requirements for U.S. and foreign vessels bound for or departing from ports or places in the United States.

(b) This subpart does not apply to boats under the Federal Boat Safety Act of 1971 (46 U.S.C. 1451, et seq.) and, except §160.215, does not apply to passenger and supply vessels when they are employed in the exploration for or in the exploitation of oil, gas, or mineral resources on the continental shelf.

(c) Sections 160.207 and 160.209 do not apply to the following:

(1) Each vessel of less than 1,600 gross tons.

(2) Each vessel operating exclusively within a Captain of the Port zone.

(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:

(i) Name, country of registry, and call sign or official number of the vessel;

(ii) Each port or place of destination; and

(iii) Dates and times of arrivals and departures at those ports or places.

(4) Each vessel arriving at a port or place under force majeure.

(5) Each vessel entering a port of call in the United States in compliance with the Automated Mutual Assistance Vessel Rescue System (AMVER).

(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).

(7) Each barge.

(8) Each public vessel.

(9) United States or Canadian flag vessels, except tank vessels or vessels carrying certain dangerous cargo, which operate solely on the Great Lakes.

(d) Sections 162.207, 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 thereinto 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.

§160.203 Definitions.

As used in this subpart:

"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.

"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.

"Certain dangerous cargo" includes any of the following:

(a) Class A explosives, as defined in 46 CFR 146.20–7 and 49 CFR 173.53.

(b) Oxidizing materials or blasting agents for which a permit is required under 49 CFR 176.415.

(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).

(d) Each cargo under Table 1 of 46 CFR Part 153 when carried in bulk.

(e) Any of the following when carried in bulk:

Acetaldehyde
Ammonia, Anhydrous
Butadiene
Butane
Butene
Butylene Oxide
Chlorine
Ethane
Ethylene
Ethylene Oxide
Methane
Methyl Acetylene, Propadiene Mixture, Stablized
Methyl Bromide
Methyl Chloride
Phosphorous, elemental
Propane
Propylene
Sulfur Dioxide
Vinyl Chloride

"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.

"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.

"Port or place of departure" means any port or place in which a vessel is anchored or moored.

"Port or place of destination" means any port or place to which a vessel is bound to anchor or moor.

"Public vessel" means a vessel owned by and being used in the public service of the United States. This definition does not include a vessel owned by the United States and engaged in a trade or commercial service or a vessel under contract or charter to the United States.

§160.205 Waivers.

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.

§160.207 Notice of arrival: vessels bound for ports or places in the United States.

(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.

(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.

(c) The Captain of the Port of the port or place of destination in the United States must be notified of–

(1) The name and country of registry of the vessel;

(2) The name of the port or place of departure;

(3) The name of the port or place of destination; and

(4) The estimated time of arrival at the port or place.

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.

§160.209 Notice of arrival: Vessels bound from the high seas for ports or places on the Great Lakes.

In addition to complying with the requirements of §160.207, the owner, master, agent, or person in charge of a vessel bound from the high seas for any port or place of destination on the Great Lakes shall notify the Commander, Ninth Coast Guard District, at least 24 hours before arriving at the Snell Locks, Massena, New York of:

(a) The name and country of registry of the vessel; and

(b) The estimated time of arrival at the Snell Locks, Massena, New York.

§160.211 Notice of arrival: Vessels carrying certain dangerous cargo.

(a) The owner, master, agent, or person in charge of a vessel, except a barge, bound for a port or place in the United States carrying a 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–

(1) The name and country of registry of the vessel;

(2) The location of the vessel at the time of the report;

(3) The name of each certain dangerous cargo carried;

(4) The amount of each certain dangerous cargo carried;

(5) The stowage location of each certain dangerous cargo;

(6) The operational condition of the equipment under 33 CFR 164.35;

(7) The name of the port or place or destination; and

(8) The estimated time of arrival at that port or place. 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.

(b) The owner, master, agent, or person in charge of a barge bound for a port or place in the United States carrying certain dangerous cargo shall report the information required in paragraph (a)(1) through (a)(8) 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.

§160.213 Notice of departure: Vessels carrying certain dangerous cargo.

(a) The owner, master, agent, 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 a certain dangerous cargo shall notify the Captain of the Port 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–

(1) The name and country of the registry of the vessel;

(2) The name of each certain dangerous cargo carried;

(3) The amount of each certain dangerous cargo carried;

(4) The stowage location of each certain dangerous cargo carried;

(5) The operational condition of the equipment under 33 CFR 164.35;

(6) The name of the port or place of departure; and

(7) The estimated time of departure from the port or place.

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.

(b) The owner, master, agent, 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)(7) 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.

§160.215 Notice of hazardous conditions.

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 162.–Inland Waterway Navigation Regulations

§162.1 General.

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.

§162.25 Ambrose Channel, New York Harbor, N.Y.; navigation. (a) The use of Ambrose Channel (formerly and before improvement called "East Channel") is hereby restricted to navigation by vessels under efficient control with their own motive power and not having barges or other vessels or floats in tow. Sailing vessels and vessels carrying tows are not permitted to use this channel except under permit as provided in paragraph (b) of this section.

(b) The Captain of the Port, New York may authorize vessels under tow to use Ambrose Channel in special cases when, in his judgment, the draft of such vessels or other conditions may render unsafe the use of other channels.

(c) Vessels permitted to use Ambrose Channel under paragraphs (a) and (b) of this section must proceed through the channel at a reasonable speed such as not to endanger other vessels and not to interfere with any work which may become necessary in maintaining, surveying, or buoying the channel; and they must not anchor in the channel except in cases of emergency, such as fog or accident, which would render progress unsafe or impossible.

(d) This section is not to be construed as prohibiting any necessary use of the channel by any Government boats while on Government duty, nor in emergencies by pilot boats whether steam or sail, nor by police boats.

(e) This section shall remain in force until modified or rescinded, and shall supplant all prior regulations governing the use of Ambrose Channel, which are hereby revoked.

§162.30 Channel of Tuckerton Creek, N.J.; navigation.

(a) Power boats or other vessels propelled by machinery shall not proceed at any time within the limits of these waters at a greater speed than 8 statute miles per hour.

§162.35 Channel of Christina River. Del.; navigation. (a) That vessels of over 20 tons capacity, propelled by machinery, shall not proceed at any time within the limits of these waters at a greater speed than 8 statute miles per hour.

§162.55 Southern Branch of Elizabeth River; speed. In that part of the Southern Branch of Elizabeth River between the junction of the Southern and Eastern Branches of the Elizabeth River and the Norfolk and Portsmouth Belt Line Railroad Bridge, no vessel shall move at a speed exceeding six knots.

§162.60 Little Creek, Va.; speed. No vessel shall proceed at a speed exceeding five knots in that part of Fishermans Cove (Northwest Branch of Little Creek) between the highway bridge on U.S. Route 60 and the mouth of the Cove.

§162.270 Restricted areas in vicinity of Maritime Administration Reserve Fleets. (a) The regulations in this section shall govern the use and navigation of waters in the vicinity of the following National Defense Reserve Fleets of the Maritime Administration, Department of Transportation:

(1) James River Reserve Fleet, Fort Eustis, Virginia.

(2) Beaumont Reserve Fleet, Neches River near Beaumont, Texas.

(3) Suisun Bay Reserve Fleet near Benicia, California.

(b) No vessels or other watercraft, except those owned or controlled by the United States Government, shall cruise or anchor between Reserve Fleet units within 500 feet of the end vessels in each Reserve Fleet unit, or within 500 feet of the extreme units of the fleets, unless specific permission to do so has first been granted in each case by the enforcing agency.

(c) The regulations in this section shall be enforced by the respective Fleet Superintendents and such agencies as they may designate.

Part 164–Navigation Safety Regulations (in part). For a complete description of this part see 33 CFR 164.

§164.01 Applicability.

(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.

§164.02 Applicability exception for foreign vessels. (See 33 CFR 164.)

§164.03 Incorporation by reference. (See 33 CFR 164.)

§164.11 Navigation underway: General.

The owner, master, or person in charge of each vessel underway shall ensure that:

(a) The wheelhouse is constantly manned by persons who–

(1) Direct and control the movement of the vessel; and

(2) Fix the vessel's position;

(b) Each person performing a duty described in paragraph (a) of this section is competent to perform that duty;

(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;

(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;

(e) Buoys alone are not used to fix the vessel's position;

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.

(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;

(g) Rudder orders are executed as given;

(h) Engine speed and direction orders are executed as given;

(i) Magnetic variation and deviation and gyrocompass errors are known and correctly applied by the person directing the movement of the vessel;

(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. 672, which requires an able seaman at the wheel on U.S. vessels of 100 gross tons or more in narrow or crowded waters or during low visibility.);

(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.

(l) Current velocity and direction for the area to be transited are known by the person directing the movement of the vessel;

(m) Predicted set and drift are known by the person directing movement of the vessel;

(n) Tidal state for the area to be transited is known by the person directing movement of the vessel;

(o) The vessel's anchors are ready for letting go;

(p) The person directing the movement of the vessel sets the vessel's speed with consideration for–

(1) The prevailing visibility and weather conditions;

(2) The proximity of the vessel to fixed shore and marine structures;

(3) The tendency of the vessel underway to squat and suffer impairment of maneuverability when there is small underkeel clearance;

(4) The comparative proportions of the vessel and the channel;

(5) The density of marine traffic;

(6) The damage that might be caused by the vessel's wake;

(7) The strength and direction of the current; and

(8) Any local vessel speed limit;

(q) The tests required by §164.25 are made and recorded in the vessel's log; and

(r) The equipment required by this part is maintained in operable condition.

(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.

(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 operating on the Great Lakes and their connecting and tributary waters.

§164.19 Requirements for vessels at anchor.

The master or person in charge of each vessel that is anchored shall ensure that–

(a) A proper anchor watch is maintained;

(b) Procedures are followed to detect a dragging anchor; and

(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.

§164.25 Tests before entering or getting underway.

(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:

(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:

(i) Each remote steering gear control system.

(ii) Each steering position located on the navigating bridge.

(iii) The main steering gear from the alternative power supply, if installed.

(iv) Each rudder angle indicator in relation to the actual position of the rudder.

(v) Each remote steering gear control system power failure alarm.

(vi) Each remote steering gear power unit failure alarm.

(vii) The full movement of the rudder to the required capabilities of the steering gear.

(2) All internal vessel control communications and vessel control alarms.

(3) Standby or emergency generator, for as long as necessary to show proper functioning, including steady state temperature and pressure readings.

(4) Storage batteries for emergency lighting and power systems in vessel control and propulsion machinery spaces.

(5) Main propulsion machinery, ahead and astern.

(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.

(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.

(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:

(1) Operation of the main steering gear from within the steering gear compartment.

(2) Operation of the means of communications between the navigating bridge and the steering compartment.

(3) Operation of the alternative power supply for the steering gear if the vessel is so equipped.

§164.30 Charts, publications, and equipment: General.

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.

§164.33 Charts and publications.

(a) Each vessel must have the following:

(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–

(i) Are of a large enough scale and have enough detail to make safe navigation of the area possible; and

(ii) Are currently corrected.

(2) For the area to be transited, a currently corrected copy of, or applicable currently corrected extract from, each of the following publications:

(i) U.S. Coast Pilot.

(ii) Coast Guard Light List.

(3) For the area to be transited, the current edition of, or applicable current extract from:

(i) Tide tables published by the National Ocean Service.

(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.

(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.

(c) As used in this section, "currently corrected" means corrected with changes contained in all Notices to Mariners published by Defense Mapping Agency Hydrographic/Topographic Center, or an equivalent foreign government publication, reasonably available to the vessel, and that is applicable to the vessel's transit.

§164.35 Equipment: All vessels.

Each vessel must have the following:

(a) A marine radar system for surface navigation.

(b) An illuminated magnetic steering compass, mounted in a binnacle, that can be read at the vessel's main steering stand.

(c) A current magnetic compass deviation table or graph or compass comparison record for the steering compass, in the wheelhouse.

(d) A gyrocompass.

(e) An illuminated repeater for the gyrocompass required by paragraph (d) of this section that is at the main steering stand, unless that gyrocompass is illuminated and is at the main steering stand.

(f) An illuminated rudder angle indicator in the wheelhouse.

(g) The following maneuvering information prominently displayed on a fact sheet in the wheelhouse:

(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.

(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.

(3) For each vessel with a fixed propeller, a table of shaft revolutions per minute for a representative range of speeds.

(4) For each vessel with a controllable pitch propeller, a table of control settings for a representative range of speeds.

(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.

(6) The maneuvering information for the normal load and normal ballast condition for–

(i) Calm weather-wind 10 knots or less, calm sea;

(ii) No current;

(iii) Deep water conditions-water depth twice the vessel's draft or greater; and

(iv) Clean hull.

(7) At the bottom of the fact sheet, the following statement:

Warning.

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:

(1) Calm weather-wind 10 knots or less, calm sea;

(2) No current;

(3) Water depth twice the vessel's draft or greater;

(4) Clean hull; and

(5) Intermediate drafts or unusual trim.

(h) An echo depth sounding device.

(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.

(j) Equipment on the bridge for plotting relative motion.

(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.

(l) 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.

(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.

(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.

§164.37 Equipment: Vessels of 10,000 gross tons or more.

(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.

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.

(b) On each tanker of 10,000 gross tons or more that is subject to Section 5 of the Port and Tanker Safety Act of 1978 (46 U.S.C. 391a), 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.

§164.38 Automatic radar plotting aids (ARPA). (See 33 CFR 164.)

§164.39 Steering gear: Tankers. (See 33 CFR 164.)

§164.40 Devices to indicate speed and distance. (See 33 CFR 164.)

§164.41 Electronic position fixing devices.

(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:

(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/DO-100 dated December 20, 1977, entitled "Minimum Performance Standards (MPS) Marine Loran-C Receiving Equipment". Each receiver installed on or after June 1, 1982, must have a label with the information required under paragraph (b) of this section. If the receiver is installed before June 1, 1982, the receiver must have the label with the information required under paragraph (b) by June 1, 1985.

(2) A satellite navigation receiver with:

(i) Automatic acquisition of satellite signals after initial operator settings have been entered; and

(ii) Position updates derived from satellite information during each usable satellite pass.

(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: Commandant (G-WWM), U.S. Coast Guard, Washington, D.C. 20593. 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.

Note.–The Federal Radionavigation Plan is available from the National Technical Information Service, Springfield, Va. 22161, with the following Government Accession Numbers:

Vol 1, ADA 116468
Vol 2, ADA 116469
Vol 3, ADA 116470
Vol 4, ADA 116471

(b) Each label required under paragraph (a)(1) of this section must show the following:

(1) The name and address of the manufacturer.

(2) The following statement by the manufacturer:

This receiver was designed and manufactured to meet Part 2 (Minimum Performance Standards) of the RTCM MPS for Marine Loran-C Receiving Equipment.

§164.42 Rate of turn indicator.

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.

§164.51 Deviations from rules: Emergency.

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.

§164.53 Deviations from rules and reporting: Non-operating equipment.

(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.

(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.

§164.55 Deviations from rules: Continuing operation or period of time.

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.

§164.61 Marine casualty reporting and record retention.

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–

(a) Ensure compliance with 46 CFR 4.05, "Notice of Marine Casualty and Voyage Records," and

(b) Ensure that the voyage records required by 46 CFR 4.05–15 are retained for–

(1) 30 days after the casualty if the vessel remains in the navigable waters of the United States; or

(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.

Part 165–Regulated Navigation Areas and Limited Access Areas

Subpart A–General

§165.1 Purpose of part.

The purpose of this part is to–

(a) Prescribe procedures for establishing different types of limited or controlled access areas and regulated navigation areas;

(b) Prescribe general regulations for different types of limited or controlled access areas and regulated navigation areas;

(c) Prescribe specific requirements for established areas; and

(d) List of specific areas and their boundaries.

§165.5 Establishment procedures.

(a) A safety zone, security zone, or regulated navigation area may be established on the initiative of any authorized Coast Guard official.

(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:

(1) The name of the person submitting the request;

(2) The location and boundaries of the safety zone, security zone, or regulated navigation area;

(3) The date, time, and duration that the safety zone, security zone, or regulated navigation area should be established;

(4) A description of the activities planned for the safety zone, security zone, or regulated navigation area;

(5) The nature of the restrictions or conditions desired; and

(6) The reason why the safety zone, security zone, or regulated navigation area is necessary.

(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.)

(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.

§165.7 Notification.

(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.

(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.

(c) Notification of the termination of the rule is usually made in the same form as the notification of its establishment.

§165.8 Geographic coordinates.

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

§165.10 Regulated navigation area.

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.

§165.11 Vessel operating requirements (regulations).

Each District Commander may control vessel traffic in an area which is determined to have hazardous conditions, by issuing regulations–

(a) Specifying times of vessel entry, movement, or departure to, from, within, or through ports, harbors, or other waters;

(b) Establishing vessel size, speed, draft limitations, and operating conditions; and

(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.

§165.13 General regulations.

(a) The master of a vessel in a regulated navigation area

shall operate the vessel in accordance with the regulations contained in Subpart F.

(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

§165.20 Safety zones.

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.

§165.23 General regulations.

Unless otherwise provided in this part–

(a) No person may enter a safety zone unless authorized by the COTP or the District Commander;

(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;

(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

(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

§165.30 Security zones.

(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.

(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–

(1) Vessels,

(2) Harbors,

(3) Ports and

(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.

§165.33 General regulations.

Unless otherwise provided in the special regulations in Subpart F of this part–

(a) No person or vessel may enter or remain in a security zone without the permission of the Captain of the Port;

(b) Each person and vessel in a security zone shall obey any direction or order of the Captain of the Port;

(c) The Captain of the Port may take possession and control of any vessel in the security zone;

(d) The Captain of the Port may remove any person, vessel, article, or thing from a security zone;

(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

(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

§165.40 Restricted Waterfront Areas.

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

§165.303 Delaware Bay and River-regulated navigation area.

(a) The following is a regulated navigation area-The waters of Delaware Bay and River, south and southwest of the southern span of the Delaware Memorial Bridge, and inside the boundary line of inland waters described 33 CFR 80.325.

(b) Regulation. (1) Draft Limitation. Unless otherwise authorized by the Captain of the Port, no vessel with a draft greater than 55 feet may enter this regulated navigation area.

(2) Oil transfer operations. Unless otherwise authorized by the Captain of the Port, no vessel may conduct oil transfer operations in this regulated navigation area except in the anchorage ground designated in 33 CFR 110.157 (a)(1).

§165.501 Chesapeake Bay entrance-regulated navigation area.

(a) The following is a regulated navigation area-The waters of the Atlantic Ocean and Chesapeake Bay enclosed by a line beginning at Fort Wool Light at 36°59′12″N., 76°18′09″W.; then to Cape Charles City Range Rear Light at 37°14′54″N., 76°01′16″W.; then south along the shoreline to Wise Point at 37°06′58″N., 75°58′18″W.; then to Cape Charles Light at 37°07′22″N., 75°54′24″W.; then to Cape Henry Light at 36°55′35″N., 76°00′27″W.; then west along the shoreline to the east side of the entrance to Little Creek at 36°55′49″N., 76°10′33″W.; then to the west side of the entrance to Little Creek at Latitude 36°55′35″N., 76°10′46″W.; then west along the shoreline to the southernmost end of the Hampton Roads Tunnel south approach span at 36°58′02″N., 76°17′51″W.; then north along that approach span to the beginning point.

(b) For the purposes of this section–

(1)"CBBT" means Chesapeake Bay Bridge-Tunnel. beginning at Chesapeake Channel Lighted Buoy 7 at 37°01′13″N., 76°03′08″W.; then to Lighted Bell Buoy 11 at 37°03′28″N., 76°05′36″W.; then to Lighted Buoy 12 at 37°03′42″N., 76°05′13″W.; then to Lighted Bell Buoy 8 at 37°01′29″N., 76°02′47″W.; then to the beginning point.

(3) Thimble Shoal Channel consists of the waters enclosed by a line beginning at Thimble Shoal Channel Lighted Bell Buoy 1 at 36°57′20″N., 76°02′47″W.; then to Lighted Buoy 19 at 37°00′10″N., 76°13′43″W.; then to Lighted Gong Buoy 20 at 37°00′19″N., 76°13′39″W.; then to Lighted Buoy 2 at 36°57′30″N., 76°02′45″W.; then to the beginning point.

(4) Thimble Shoal North Auxiliary Channel consists of the waters in a rectangular area 450 feet wide adjacent to the north side of Thimble Shoal Channel, the southern boundary of which extends from Lighted Buoy 2 at 36°57′30″N., 76°02′45″W.; to Lighted Gong Buoy 20 at 37°00′19″N., 76°13′39″W.

(5) Thimble Shoal South Auxiliary Channel consists of the waters in a rectangular area 450 feet wide adjacent to the south side of Thimble Shoal Channel, the northern boundary of which extends from Lighted Bell Buoy 1 at 36°57′20″N., 76°02′47″W.; to Lighted Buoy 19 at 37°00′10″N., 76°13′43″W.

(c) Regulations:

(1) Anchoring Prohibition. No vessel over 100 gross tons

may anchor or moor in this regulated navigation area, except that a self-propelled vessel may anchor or moor in an anchorage ground designated under 33 CFR 110.168 (g) if it–

(i) Can get underway within 30 minutes with sufficient power to maneuver to keep clear of the CBBT and other vessels; and

(ii) Has no impairment to its maneuverability such as defective steering equipment or defective main propulsion machinery.

(2) Secondary Towing Rig.

(i) No vessel over 100 gross tons may be towed in this regulated navigation area unless it is equipped with a secondary towing rig in addition to its primary towing rig that–

(A) Is of sufficient strength for towing the vessel;

(B) Has a connecting device that can receive a shackle pin of at least two inches in diameter; and

(C) Is fitted with a recovery pickup line led outboard of the vessel's hull.

(ii) For the purpose of this subparagraph, a tow consisting of two or more vessels, each of which is less than 100 gross tons, and the total gross tonnage of which is greater than 100 gross tons, shall be treated as if it were one vessel under tow that is over 100 gross tons.

(3) Anchoring Detail. Whenever a self-propelled vessel over 100 gross tons, equipped with an anchor or anchors, except a tugboat equipped with bow fenderwork of a type of construction that the anchor cannot be rigged for quick release, is underway within two nautical miles of the CBBT, its personnel must be stationed at locations where the vessel can be anchored in an emergency without delay.

(4) Draft Limitation. No vessel drawing less than 25 feet may enter Thimble Shoal Channel except to cross that channel.

(5) Direction of Traffic. No vessel may proceed in–

(i) Thimble Shoal North Auxiliary Channel except in a westbound direction or to cross that channel; or

(ii) Thimble Shoal South Auxiliary Channel except in an eastbound direction or to cross that channel.

(6) Impaired Vessel Maneuverability.

(i) Before entry. No vessel over 100 gross tons, if its maneuverability is impaired because of any condition such as hazardous weather, defective steering equipment, defective main propulsion machinery, or damage to the vessel, may enter the regulated navigation area unless–

(A) It is attended by one or more tugboats with total sufficient power to ensure its safe passage through the regulated navigation area; or

(B) Its entry as otherwise authorized by the Captain of the Port.

(ii) After entry. If the maneuverability of a vessel over 100 gross tons underway in the regulated navigation area becomes impaired because of any condition, the master of the vessel shall as soon as possible thereafter–

(A) Report the impairment to the Captain of the Port; and

(B) Have the vessel attended by one or more tugboats described in paragraph (c)(6)(i)(A) of this section, except when otherwise authorized by the Captain of the Port.

(7) Navigation Charts; Radar and Pilots. No vessel over 100 gross tons may enter the regulated navigation area unless–

(i) The vessel has on board navigation charts of the regulated navigation area and, during reduced visibility, operative radar; or

(ii) The vessel has a pilot or other person on board with previous experience in navigating the waters of the regulated navigation area; or

(iii) The Captain of the Port has been given notice of the time and place of entry of the vessel.

(8) Emergencies. In an emergency, any person may deviate from any regulation in this section to the extent necessary to avoid endangering persons, property, or the environment. However, each vessel over 100 gross tons, except for a self-propelled vessel that can get underway within 30 minutes with sufficient power to maneuver to keep clear of the CBBT and other vessels, and that has no impairment to its maneuverability such as defective steering equipment or defective main propulsion machinery, that anchors or moors in the regulated navigation area because of an emergency, must as soon as possible–

(i) Notify the Captain of the Port of the place of anchoring or mooring; and

(ii) Be attended by one or more vessels of sufficient power to keep the vessel in the position where it is anchored or moored.

(9) Waiver.

(i) The Captain of the Port may, upon request, waive any regulation in this paragraph if it is found that the proposed operations under the waiver can be done safely. An application for a waiver must state the need for the waiver and describe the proposed operations.

(ii) Compliance with this paragraph is not required to the extent necessary to carry out the following operations:

(A) Law enforcement.

(B) The servicing of aids to navigation or the surveying, maintenance, or improvement of waters in the regulated navigation area.

(d) Control of vessel anchoring, mooring, and movement:

(1) When necessary to prevent damage to, or destruction or loss of, any vessel or the CBBT, the Captain of the Port may issue directions requiring the further anchoring, mooring, or movement of a vessel that has anchored or moored in this regulated navigation area because of an emergency.

(2) The master of a vessel in the regulated navigation area shall comply with each direction issued to that master under this section.

§165.502 Cove Point, Chesapeake Bay, Maryland-safety zone.

(a) The waters and waterfront facilities located within the following boundaries constitute a safety zone effective when an LNG (Liquefied Natural Gas) carrier is maneuvering in the vicinity of the Cove Point terminal and when a moored LNG carrier indicates its intention to get underway: A line beginning at a point one-half mile NW of the end of the north pier of the Columbia LNG facility at Cove Point, Maryland, located at 38°24′43″N. latitude, 78°23′32″W. longitude, thence 056°T to a point 2,800 yards offshore at 38°24′59″N. latitude, 76°23′01″W. longitude, thence 146°T to a point located 2,300 yards offshore at 38°23′52″N. latitude, 76°22′03″W. longitude; thence 236°T to a point one-half mile SE of the end of the south pier of the Columbia LNG facility at Cove Point, Maryland, located 38°23′39″N. latitude, 76°22′35″W. longitude; thence northwesterly to the point of origin and the area within 50 yards on the shore side of the Columbia LNG Corporation offshore terminal.

(b) The waters and waterfront facilities located within the following boundary constitute a safety zone when a LNG carrier is moored at the Columbia LNG offshore terminal; an area extending 50 yards shoreward of the offshore terminal and 200 yards offshore of all parts of the offshore terminal and the LNG carrier.

(c) The waters and waterfront facilities located within the

following boundary constitute a safety zone when no LNG carrier is moored at the receiving terminal: the area within 50 yards of the Columbia LNG offshore terminal, at Cove Point, Maryland.

§165.503 Chesapeake Bay ice navigation season.

(a) The following is a Regulated Navigation Area: the waters within the boundary of a line which starts at the intersection of the Delaware-Maryland boundary and the coastline and follows the Delaware-Maryland boundary west and north to the Pennsylvania boundary but includes the Chesapeake and Delaware Canal and the reaches of the Nanticoke River; thence due east along the Pennsylvania-Maryland boundary to the West Virginia boundary; thence south and eastward along the Maryland-West Virginia boundary to the Virginia boundary; thence southwestward along the Virginia-West Virginia boundary to a point 39°06'N. latitude, 78°30'W. longitude; thence to a point 38°19.5'N. latitude, 77°25.2'W. longitude; thence to a point 37°55'N. latitude, 76°28.2'W. longitude; thence to a point 37°55'N. latitude, 76°16.8'W. longitude; thence to a point 37°56.5'N. latitude, 76°10.5'W. longitude; thence to point 37°57.2'N. latitude, 76°03'W. longitude on Chesapeake Bay; thence along the Maryland-Virginia boundary to the sea.

(b) The regulations in paragraph (c) and (d) of this section are placed in effect and terminated by the Captain of the Port Baltimore by notice in the Federal Register. Notice is also given in the Fifth Coast Guard District Local Notice to Mariners and other available public notice means such as COTP newsletters and news broadcasts. This Regulated Navigation Area will normally be placed in effect and terminated between December and March of the following year.

(c) This Regulated Navigation Area applies to:

(1) Operators of those vessels defined under subparagraph (3) of section 5 of the Port and Tanker Safety Act, 92 Stat. 1482 (46 U.S.C. 391a), which includes any vessel–

(i) Regardless of tonnage, size, or manner or propulsion;

(ii) Whether self-propelled or not; and

(iii) Which carries oil or any hazardous materials in bulk as cargo or in residue;

(2) Operators of those vessels defined under section 4, subparagraphs (1) through (3) of the Vessel Bridge-to-Bridge Radiotelephone Act. 85 Stat. 164 (33 U.S.C. 1203(a)(1) through (3), which includes–

(i) Every power-driven vessel of three hundred gross tons and upward;

(ii) Every vessel of one hundred gross tons and upward carrying one or more passengers for hire; and

(iii) Every towing vessel of twenty-six feet or greater in length.

(d) Upon entering or getting underway in this Regulated Navigation Area when the regulations in this section are in effect, operators of vessels described in paragraph (c) of this section shall check with the Captain of the Port, Baltimore, by the most rapid means available, and request the current COTP Orders issued for this Regulated Navigation Area. Operators of affected vessels that cannot meet this requirement shall not navigate their vessels in the Regulated Navigation Area.

(e) If unable to comply with a currently effective COTP Order, operators of vessels described in paragraph (c) of this section shall not navigate their vessels in the Regulated Navigation Area and shall notify COTP Baltimore by the most rapid means available. Such notification shall include:

(1) The name of the vessel,

(2) The vessel's location, and

(3) That provision of the currently effective order with which the vessel cannot comply.

§165.504 Newport News Shipbuilding and Dry Dock Company Shipyard, James River, Newport News, VA

(a) Location. The following is a security zone: The waters of the James River encompassed by a line beginning at the intersection of the shoreline with the northernmost property line of the Newport News Shipbuilding and Dry Dock Co. at

latitude 37° 00′ 38.1″ N, longitude 76° 27′ 05.7″ W, thence southerly to

36° 59′ 58.4″ N, 76° 27′ 16.7″ W, thence southeasterly to

36° 59′ 23.0″ N, 76° 26′ 54.6″ W, thence westerly to

36° 59′ 21.5″ N, 76° 26′ 58.4″ W, thence southeasterly to

36° 59′ 12.9″ N, 76° 26′ 52.4″ W, thence easterly to

36° 59′ 14.2″ N, 76° 26′ 49.1″ W, thence southeasterly to

36° 58′ 37.8″ N, 76° 26′ 26.3″ W, thence easterly to

36° 58′ 43.5″ N, 76° 26′ 13.7″ W, thence northerly to the intersection of the shoreline with the southernmost property line of the Newport News Shipbuilding and Dry Dock Co. at

36° 58′ 48.0″ N, 76° 26′ 11.2″ W, thence northwesterly along the shoreline to the point of beginning.

(b) Security zone anchorage. The following is a security zone anchorage: The waters of the James River encompassed by a line beginning at the intersection of the shoreline with the northernmost property line of the Newport News Shipbuilding and Dry Dock Company shipyard at

37° 00′ 38.1″ N, 76° 27′ 05.7″ W, thence southerly to

36° 59′ 58.4″ N, 76° 27′ 16.7″ W, thence along the shoreline to the point of beginning.

(c) Special Regulations.

(1) Section 165.33 (a), (e), and (f) do not apply to the following vessels or individuals on board those vessels:

(i) Public vessels of the United States.

(ii) Public vessels owned or operated by the Commonwealth of Virginia or its subdivisions for law enforcement or firefighting purposes.

(iii) Vessels owned by, operated by, or under charter to Newport News Shipbuilding and Dry Dock Co.

(iv) Vessels that are performing work at Newport News Shipbuilding and Dry Dock Co., including the vessels of subcontractors and other vendors of Newport News Shipbuilding and Dry Dock Co. or other persons that have a contractual relationship with Newport News Shipbuilding and Dry Dock Co.

(v) Vessels that are being built, rebuilt, repaired, or otherwise worked on at or by Newport News Shipbuilding and Dry Dock Co. or another person authorized to perform work at the shipyard.

(vi) Vessels that are authorized by Newport News Shipbuilding and Dry Dock Company to moor at and use its facilities.

(vii) Commercial shellfish harvesting vessels taking clams from the shellfish beds within the zone, if—

(A) The owner of the vessel has previously provided the Captain of the Port, Hampton Roads, Virginia, information about the vessel, including:

(1) The name of the vessel;

(2) The vessel's official number, if documented, or state number, if numbered by a State issuing authority;

(3) A brief description of the vessel, including length, color, and type of vessel;

(4) The name, Social Security number, current address, and telephone number of the vessel's master, operator, or person in charge; and

(5) Upon request, information the vessel's crew.

(B) The vessel is operated in compliance with any specific orders issued to the vessel by the Captain of the Port or

other regulations controlling the operation of vessels within the security zone that may be in effect.

(2) Any vessel authorized to enter or remain in the security zone may anchor in the security zone anchorage.

(3) Other vessels desiring access to this zone shall secure permission from the Captain of the Port through the Security Office of the U.S. Navy Supervisor of Shipbuilding, Conversion, and Repair at Newport News, Virginia. The request shall be forwarded in a timely manner to the Captain of The Port by the appropriate Navy official.

(d) Enforcement. The U.S. Coast Guard may be assisted in the enforcement of this zone by the U.S. Navy.

§165.505 Elizabeth River, Norfolk, Virginia.

(a) The waters and waterfront facilities located within the following boundaries are a safety zone when a naval aircraft carrier is transiting the Elizabeth River to or from Norfolk Naval Shipyard, Portsmouth, Virginia: a circle with a radius of 500 yards with the transiting vessel as its center.

(b) The Captain of the Port will notify the maritime community of periods which this safety zone will be effective through Notice to Mariners and other normal means of notification.

Part 166–Shipping Safety Fairways

Subpart A–General

§166.100 Purpose.

The purpose of these regulations is to establish and designate shipping safety fairways and fairway anchorages to provide unobstructed approaches for vessels using U.S. ports.

§166.103 Geographic Coordinates.

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.

§166.105 Definitions.

(a) "Shipping safety fairway" or "fairway" means a lane or corridor in which no artificial island or fixed structure, whether temporary or permanent, will be permitted. Temporary underwater obstacles may be permitted under certain conditions described for specific areas in Subpart B. Aids to navigation approved by the U.S. Coast Guard may be established in a fairway.

(b) "Fairway anchorage" means an anchorage area contiguous to and associated with a fairway, in which fixed structures may be permitted within certain spacing limitations, as described for specific areas in Subpart B.

§166.110 Modification of areas.

Fairways and fairway anchorages are subject to modification in accordance with 33 U.S.C. 1223(c); 92 Stat. 1473.

Subpart B-Designation of Fairways and Fairway Anchorages (in part)

§166.500 Areas along the Atlantic Coast.

(a) Purpose. Fairways, as described in this section are established to control the erection of structures therein to provide safe vessel routes along the Atlantic Coast.

(b) Designated areas.–(1) Off New York Shipping Safety Fairway.

(i) Nantucket to Ambrose Safety Fairway. The area enclosed by rhumb lines, (North American Datum of 1927 (NAD-27)), joining points at:

40°32′20″N., 73°04′57″W.
40°30′58″N., 71°58′25″W.
40°34′07″N., 70°19′23″W.
40°35′37″N., 70°14′09″W.
40°30′37″N., 70°14′00″W.
40°32′07″N., 70°19′19″W.
40°28′58″N., 72°58′25″W.
40°27′20″N., 73°04′57″W.

(ii) Ambrose to Nantucket Safety Fairway. The area enclosed by rhumb lines, NAD-27, joining points at:

40°24′20″N., 73°04′58″W.
40°22′58″N., 72°58′26″W.
40°26′07″N., 70°19′09″W.
40°27′37″N., 70°13′46″W.
40°22′37″N., 70°13′36″W.
40°24′07″N., 70°19′05″W.
40°20′58″N., 72°58′26″W.
40°19′20″N., 73°04′58″W.

Part 167–Offshore Traffic Separation Schemes

Subpart A–General

§167.1 Purpose.

The purpose of the regulations in this part is to establish and designate traffic separation schemes and precautionary areas to provide access routes for vessels proceeding to and from U.S. ports.

§167.3 Geographic coordinates.

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.

§167.5 Definitions.

(a) "Traffic separation scheme" (TSS) means a designated routing measure which is aimed at the separation of opposing streams of traffic by appropriate means and by the establishment of traffic lanes.

(b) "Traffic lane" means an area within defined limits in which one-way traffic is established. Natural obstacles, including those forming separation zones, may constitute a boundary.

(c) "Separation zone or line" means a zone or line separating the traffic lanes in which ships are proceeding in opposite or nearly opposite directions; or separating a traffic lane from the adjacent sea area; or separating traffic lanes designated for particular classes of ships proceeding in the same direction.

(d) "Precautionary area" means a routing measure comprising an area within defined limits where ships must navigate with particular caution and within which the direction of traffic flow may be recommended.

§166.10 Operating rules.

The operator of a vessel in a TSS shall comply with Rule 10 of the International Regulations for Preventing Collisions at Sea, 1972, as amended.

§167.15 Modification of schemes.

(a) A traffic separation scheme or precautionary area described in this Part may be permanently amended in accordance with 33 U.S.C. 1223 (92 Stat. 1473), and with international agreements.

(b) A traffic separation scheme or precautionary area in this Part may be temporarily adjusted by the Commandant of the Coast Guard in an emergency, or to accommodate operations which would create an undue hazard for vessels using the scheme or which would contravene Rule 10 of the International Regulations for Preventing Collisions at Sea,

1972. Adjustment may be in the form of a temporary traffic lane shift, a temporary suspension of a section of the scheme, a temporary precautionary area overlaying a lane, or other appropriate measure. Adjustments will only be made where, in the judgment of the Coast Guard, there is no reasonable alternative means of conducting an operation and navigation safety will not be jeopardized by the adjustment. Notice of adjustments will be made in the appropriate Notice to Mariners and in the Federal Register. Requests by members of the public for temporary adjustments to traffic separation schemes must be submitted 150 days prior to the time the adjustment is desired. Such Requests, describing the interference that would otherwise occur to a TSS, should be submitted to the District Commander of the Coast Guard District in which the TSS is located.

Atlantic East Coast

§167.150 Off New York Traffic Separation Scheme and Precautionary Areas.

The specific areas in the Off New York Traffic Separation Scheme and Precautionary Areas are described in §§167.151, 167.152, 167.153, 167.154, and 167.155 of this chapter.

§167.151 Precautionary areas.

(a) A circular precautionary area with a radius of seven miles is established centered upon Ambrose Light in geographic position

40°27.50″N., 73°49.90″W.

(b) A precautionary area is established between the traffic separation scheme "Eastern Approach, off Nantucket" and the traffic separation scheme "In the Approach to Boston, Massachusetts." (1) The precautionary area is bounded to the east by a circle of radius 15.5 miles, centered upon geographic position

40°35.00′N., 69°00.00′W., and is intersected by the traffic separation scheme "In the Approach to Boston, Massachusetts" and "Off New York" at the following geographic positions:

40°50.33′N., 68°57.00′W.
40°23.75′N., 69°14.63′W.

(2) The precautionary area is bounded to the west by a line connecting the two traffic separation schemes between the following geographic positions:

40°36.75′N., 68°15.16′W.
40°48.00′N., 68°03.33′W.

§167.152 Eastern approach, off Nantucket.

(a) A separation zone is established bounded by a line connecting the following geographic positions:

40°28.75′N., 69°14.83′W.
40°27.62′N., 70°13.77′W.
40°30.62′N., 70°14.00′W.
40°31.75′N., 69°14.97′W.

(b) A traffic lane for westbound traffic is established between the separation zone and a line connecting the following geographic positions:

40°36.75′N., 69°15.17′W.
40°35.62′N., 70°15.15′W.

(c) A traffic lane for eastbound traffic is established between the separation zone and a line connecting the following geographic positions:

40°22.62′N., 70°13.60′W.
40°23.75′N., 69°14.63′W.

§167.153 Eastern approach, off Ambrose Light.

(a) A separation zone is established bounded by a line connecting the following geographic positions:

40°24.33′N., 73°04.97′W.
40°24.20′N., 73°11.50′W.
40°26.00′N., 73°40.93′W.
40°27.00′N., 73°40.75′W.
40°27.20′N., 73°11.50′W.
40°27.33′N., 73°04.95′W.

(b) A traffic lane for westbound traffic is established between the separation zone and a line connecting the following geographic positions:

40°32.33′N., 73°04.95′W.
40°32.20′N., 73°11.50′W.
40°28.00′N., 73°40.73′W.

(c) A traffic lane for eastbound traffic is established between the separation zone and a line connecting the following geographic positions:

40°25.05′N., 73°41.32′W.
40°19.20′N., 73°11.50′W.
40°19.33′N., 73°04.97′W.

§167.154 Southeastern approach.

(a) A separation zone is established bounded by a line connecting the following geographic positions:

40°03.10′N., 73°17.93′W.
40°06.50′N., 73°22.73′W.
40°22.45′N., 73°43.55′W.
40°23.20′N., 73°42.70′W.
40°24.20′N., 73°04.58′W.
40°08.72′N., 73°20.10′W.

(b) A traffic lane for northwest-bound traffic is established between the separation zone and a line connecting the following geographic positions:

40°08.98′N., 73°10.87′W.
40°12.42′N., 73°15.67′W.
40°24.02′N., 73°41.97′W.

(c) A traffic lane for southeast-bound traffic is established between the separation zone and a line connecting the following geographic positions:

40°21.82′N., 73°44.55′W.
40°02.80′N., 73°27.15′W.
39°59.43′N., 73°22.35′W.

§167.155 Southern approach.

(a) A separation zone is established bounded by a line connecting the following geographic positions:

39°45.70′N., 73°48.00′W.
40°20.63′N., 73°48.33′W.
40°20.87′N., 73°47.07′W.
39°45.70′N., 73°44.00′W.

(b) A traffic lane for northbound traffic is established between the separation zone and a line connecting the following geographic positions:

39°45.70′N., 73°37.70′W.
40°21.25′N., 73°45.85′W.

(c) A traffic lane for southbound traffic is established between the separation zone and a line connecting the following geographic positions:

40°20.53′N., 73°49.65′W.
39°45.70′N., 73°54.40′W.

Note.–Use of LORAN C enables masters of appropriately equipped vessels to be informed highly accurately and continuously about the vessel's position in the area covered by this scheme.

Part 207–Navigation Regulations

§207.100 Inland Waterway from Delaware River to Chesapeake Bay, Delaware and Maryland (Chesapeake and Delaware Canal); use, administration, and navigation. These regulations are given in the description of the canal in chapter 7 of this Coast Pilot. **Part 334-Danger Zones and Restricted Area Regulations**

§334.90 Waters of Atlantic Ocean; National Guard Training Center, Sea Girt, N.J. (a) The danger zone. (1) Beginning at a point defined by the North Range Flagpole

along the east shore of the National Guard Training Center at latitude 40°07′20″, longitude 74°01′54″; thence northeasterly to latitude 40°07′38″, longitude 74°01′28″; thence northeasterly to latitude 40°07′40″, longitude 74°00′41″; thence easterly to latitude 40°07′10″, longitude 73°59′04″; thence southerly to latitude 40°06′18″, longitude 73°59′20″; thence westerly to latitude 40°06′25″, longitude 74°01′05″; thence northwesterly to latitude 40°06′43″, longitude 74°01′46″; and thence northwesterly to the east shore to a point defined by the South Range Flagpole at latitude 40°07′07″, longitude 74°01′58″.

(2) The area described in paragraph (a)(1) of this section will be marked by lighted buoys located at the extreme offshore corners and can buoys at the other corners of the danger zone to be placed and maintained by the Department of Defense, State of New Jersey.

(b) Regulations. (1) Range firing will normally take place between the hours of 7 a.m. and 6 p.m. on all Saturdays and Sundays during the period April 1 to November 30 and between the hours of 7 a.m. and 12 p.m., Monday through Friday, during the period January 1 to December 31 annually.

(2) No vessel shall enter or remain in the danger zone during the operation of the firing range, excepting vessels of the United States or the State of New Jersey.

(3) When firing is scheduled or is in progress during daylight hours, a large red flag will be displayed from the flagstaffs on the beach. When firing is scheduled or is in progress during nighttime hours, a blinking and/or revolving red warning light will be displayed from the top of the same flagstaff on the beach. Flagstaffs are located at both the northern and southern boundaries of the training center. Warning flags and lights shall be clearly visible for a distance of at least three (3) miles offshore.

(4) No permits to erect and maintain fish pounds within the zone will hereafter be issued.

(5) The regulations in this section shall be enforced by The Chief of Staff, Department of Defense, State of New Jersey, and such agencies as he may designate.

§334.100 Atlantic Ocean off Cape May, N.J.; Coast Guard Rifle Range. (a) The danger zone. The waters of the Atlantic Ocean within an area described as follows: Beginning at Cape May West Jetty Light; thence 180° true, 800 yards; thence 250° true 1,325 yards; and thence 335° true to the shore line.

(b) The regulations. (1) No vessel shall enter or remain in the danger area between sunrise and sunset daily, except as authorized by the enforcing agency.

(2) The regulations in this section shall be enforced by the Commander, Third Coast Guard District, or his authorized representative.

§334.110 Delaware Bay off Cape Henlopen, Del.; naval restricted area. (a) The area. Beginning at a point on the south shore of Delaware Bay at longitude 75°06′12″; thence to latitude 38°47′25″, longitude 75°06′20″; thence to latitude 38°47′48″, longitude 75°06′00″; thence to latitude 38°50′43″, longitude 75°02′11″; thence to latitude 38°49′16″, longitude 74°59′35″; thence to a point on the shore at latitude 38°46′09″; thence northwesterly and southwesterly along the shore at Cape Henlopen to the point of beginning.

(b) The regulations. (1) Anchoring, trawl fishing, crabbing, dragging, grappling, and towing with hawser on bottom are prohibited in the area and no object attached to a vessel shall be placed on or near the bottom.

(2) This section does not apply to anchored floating navigational aids or to placement or removal of such aids by the Coast Guard.

(3) This section does not apply to vessels engaged in commercial or pleasure boat fishing provided anchors, trawls, and ground tackle are not used.

(4) The regulations in this section shall be enforced by the Commandant, Fourth Naval District, and such agencies as he may designate.

§334.120 Delaware Bay off Milford Neck; naval aircraft bombing target area. (a) The danger zone. A circular area of one nautical mile radius having its center in Delaware Bay at latitude 38°58′12″, longitude 75°17′30″.

(b) The regulations. (1) Anchoring, trawling, crabbing, fishing and dragging in the danger zone are prohibited during daylight hours.

(2) The regulations in this section shall be enforced by the Commandant, Fourth Naval District, and such agencies as he may designate.

§334.130 Atlantic Ocean off Wallops Island and Chincoteague Inlet, Va.; danger zone. (a) The area. An area immediately offshore from Wallops Island defined by lines drawn as follows: Beginning at latitude 37°51′30″ N., longitude 75°27′30″ W.; thence to latitude 37°51′30″ N., longitude 75°17′12″ W.; thence to latitude 37°43′18″ N., longitude 75°29′42″ W.: and thence to latitude 37°49′18″ N., longitude 75°29′42″ W.

(b) The regulations. (1) Vessels may enter and operate in the danger zone at all times when warning signals are not displayed.

(2) When warning signals are displayed, all vessels in the danger zone except vessels entering or departing Chincoteague Inlet shall leave the zone promptly by the shortest possible route and shall remain outside the zone until allowed by a patrol boat to enter, or until the danger signal has been discontinued. Vessels entering or departing Chincoteague Inlet shall take the shortest passage possible through the danger zone upon display of the danger signal.

(3) The intent to conduct rocket-launching operations involving the area shall be indicated by a signal consisting of a large orange-colored, "blimp-shaped" balloon by day and a signal rotating alternately red and white beacon by night. The balloon shall be flown at latitude 37°50′38″, longitude 75°28′47″ and the beacon shall be displayed about 200 feet above mean high water at latitude 37°50′16″, longitude 75°29′07″. The appropriate one of these signals shall be displayed 30 minutes prior to rocket-launching time and shall remain displayed until danger no longer exists.

(4) The regulations in this section shall be enforced by the Director, Wallops Station, National Aeronautics and Space Administration, Wallops Island, Va., or such agencies as he may designate.

§334.140 Chesapeake Bay; United States Army Proving Ground Reservation, Aberdeen, Md. (a) Restricted area defined. The following indicates the limits of the waters of or adjacent to the Aberdeen Proving Ground, Maryland, and inside of which boundaries will lie the restricted area known as the Aberdeen Proving Ground, Maryland.

(1) Beginning at a point on the westerly side of Chesapeake Bay, at the south side of the mouth of Swan Creek, Harford County, Maryland, the most northerly point of the reservation known as Plum Point; thence southeasterly along the low water mark on the shore of Chesapeake Bay to and across the north entrance of Spesutie Narrows to and thence along the low water mark on the north shore of Spesutie Island to Locust Point; thence along straight line from Locust Point to Turkey Point for a distance of approximately 1,400 yards; thence following a line parallel with and 1,000 yards from the low water mark on the easterly shore of Spesutie Island to a point 1,000 yards due southeast of Sandy Point; thence approximately southwest

in a straight line to a point approximately 1,250 yards S. 10°30′ W. from Bear Point; thence approximately 9,275 yards S. 51°04′ W. to a point in Chesapeake Bay about 1,700 yards due east from Taylor Island Point; thence southwesterly in a straight course, except such variations as may be necessary to include all of Pooles Island to the southwesterly point of Pooles Island, thence in a northwesterly direction to the most southwesterly point of Spry Island, including all of Spry Island; thence northwesterly in a straight line to extreme southerly island off Lower Island Point; thence northwesterly in a straight line through Brier Point to a point in Seneca Creek where this line intersects a straight line which passes through monuments No. 124 and No. 125 on westerly part of Carroll Island; thence northeasterly in a straight line passing through Marshy Point, at the junction of Dundee Creek and Saltpeter Creek, to the intersection of the center line of Reardon Inlet with Gunpowder River, except such variations as may be necessary to exclude any and all parts of the point of land on the westerly side of Gunpowder River about one mile south of Oliver Point; thence northerly along the center line of Reardon Inlet to its intersection with the southeasterly line of the right of way of the Pennsylvania Railroad; thence northeast along the Pennsylvania Railroad following the reservation boundary line to shore of Bush River, and along its western shore to Fairview Point; thence northeast in a straight line across Bush River to concrete monument No. 64, located on the eastern shore of Bush River, south of Chelsea; thence along the eastern shore of Bush River northerly to the mouth of Sod Run; thence by a broken line along the boundary of the reservation to Swan Creek; and thence in a straight line to Plum Point. (The above description may be traced on National Ocean Survey Chart No. 12273.)

(b) Authority delegated Commanding Officer. The Commanding Officer, Aberdeen Proving Ground, has been delegated the authority by the Secretary of the Army to designate from time to time by suitably posted bulletins or announcements, the conditions under which the public, including food fishermen and crabbers, may enter restricted waters of the Aberdeen Proving Ground.

(c) Penalty. All persons who enter the restricted waters, except as authorized in this section, without the authority of the Commanding Officer, Aberdeen Proving Ground Md., are under the terms of the information given above, guilty of a misdemeanor and upon conviction thereon are punishable by a fine not exceeding $500 or by imprisonment not exceeding 6 months.

(d) Entrance into restricted waters by the public.

(1) The following water areas are closed to the public at all times:

(i) Spesutie Narrows-all waters north and east of a line between Bear Point and Black Point;

(ii) All creeks except Lauderick Creek;

(iii) The water adjacent to Carroll Island which lies between Brier Point and Lower Island Point also known as Hawthorne Cove;

(iv) The waters immediately off the mouth of Romney Creek;

(v) The waters adjacent to Abbey Point Recovery Field more accurately described as area number 16; depicted in Aberdeen Proving Ground Regulation 210–10, Appendix A.

(vi) The waters on the north side of the Bush River from Pond Point to Chelsea Chimney are closed for fishing purposes.

(2) The remainder of the restricted areas will normally be open for authorized use (including navigation and fishing) during the following hours:

(i) Monday through Thursday, 5 p.m. to 7:30 a.m.;

(ii) Weekends, 5 p.m. Friday to 7:30 a.m. Monday;

(iii) National (not State) holidays, 5 p.m. the day preceding the holiday to 7:30 a.m. the day following the holiday.

(3) When requirements of tests, as determined by the Commanding Officer, Aberdeen Proving Ground, or his designee, necessitate closing the restricted areas during the aforementioned times and days, the Commanding Officer, Aberdeen Proving Ground, will publish appropriate circulars or cause to be broadcast over local radio stations notices informing the public of the time and days which entrance to the restricted waters of Aberdeen Proving Ground by the general public will be prohibited.

(4) A fleet of patrol boats will be positioned at the perimeter of the restricted water zone boundaries (except in extreme weather conditions such as gales or ice) during periods of testing to prevent unauthorized entry. If necessary to attract attention of another vessel about to penetrate the restricted area, the patrol boat may operate a distinctive rotating blue and red light, public address system, and sound a siren, or by radio contact on shipshore FM channel 16 and citizen band channel 12. Buoys will mark the restricted waters along the Chesapeake Bay perimeter during the period, normally 4 June through 1 October annually.

(5) Authorized use. Authorized use as used in this section is defined as fishing from a vessel, navigation using a vessel to transverse a water area, or anchoring a vessel in a water area. Any person who touches any land, or docks or grounds a vessel, within the boundaries of Aberdeen Proving Ground, Maryland, is not using the area for an authorized use and is in violation of this regulation. Further, water skiing in the water area of Aberdeen Proving Ground is permitted as an authorized use when the water area is open for use by the general public provided that no water skier touches any land either dry land (fast land) or subaqueous land and comes no closer than 200 meters from any shoreline. Further, if any person is in the water area of Aberdeen Proving Ground, Maryland, outside of any vessel (except for the purposes of water skiing as outlined above) including, but not limited to, swimming, scuba diving, or other purpose, that person is not using the water in an authorized manner and is in violation of this regulation.

(e) Entry onto land and limitations of firing over land. (1) Entry onto any land, either dry land (fast land) or subaqueous land, within the boundaries of the Aberdeen Proving Ground Reservation as defined in paragraph (a)(1) is prohibited at all times. Provided, the Commander, Aberdeen Proving Ground, is authorized to grant exceptions to this regulation either by written permission or by local regulation. Entry onto the land is punishable as in paragraph (c) of this section.

(2) There are no limitations on test firing by Federal testing facilities at Aberdeen Proving Ground over land be belonging to Aberdeen Proving Ground.

(f) Permits required from the Commanding Officer to set fixed nets in restricted waters. (1) Fishermen and crabbers desiring to set fixed nets within the restricted waters of Aberdeen Proving Ground Reservation are required in every instance to have a written permit. A fixed net for the purpose of this paragraph is defined as a pound net, staked gill net, hedge fike net, hoop net, eel pot, crab pot, and all other types of nets fastened by means of poles, stakes, weights, or anchors. Permits to fish and crab within the restricted waters of Aberdeen Proving Ground may be obtained by written application to the Commanding Officer,

Department of the Army, Aberdeen Proving Ground, Attention: Provost Marshall Division, Aberdeen Proving Ground, Md. Applicants for permits must state the location at which they desire to set fixed nets and state the period of time for which they desire the permit to cover. Nets placed in the restricted waters are subject to damage by gunfire and bombing, and the risk of such damage will be assumed by the holder of the permit.

(2) Holders of permits for setting fixed nets must comply with the provisions of this part and also with 33 CFR 206.50(d), not carried in this Pilot.

(g) Identification signs required at each location of fixed nets. Fishermen and crabbers who have been granted permits to fish or crab within the restricted waters of Aberdeen Proving Ground Reservation with fixed nets must at each location have a stake securely driven at the outer end of the line of nets on which is mounted a sign board which contains their name and permit number. All stakes set within the restricted area established by this regulation will project at least three (3) feet above the surface of the water at all ordinary high stages of the tide. Nets and other fishing and crabbing structures erected will be marked by stakes set at intervals not greater than fifty (50) feet. Fishing and crabbing structures erected in Aberdeen Proving Ground waters will be plainly marked on both ends, and will be lighted with a white light between sunset and sunrise, by and at the expense of the owner.

(h) Removal of pound net poles and or stakes. At the end of the fishing and crabbing season, fishermen and crabbers must remove and haul away from the location all pound nets, pots, poles or stakes used in their operation. Pound net poles or stakes must not be cast adrift after removal.

(i) Restrictions on fishermen and crabbers. It must be distinctly understood that holders of permits to fish or crab are not authorized to enter the restricted waters of Aberdeen Proving Ground Reservation outside the hours as announced by the Commanding Officer, Aberdeen Proving Ground. In addition, the privileges granted in this paragraph include no right to land nor to cut or procure pound nets poles or stakes on the Aberdeen Proving Ground Reservation.

(j) Aberdeen Proving Ground Regulations (APGR) 210–10 will govern commercial fishing and crabbing and APGR 210–26 will govern recreational (non-commercial) fishing and crabbing. This section shall be enforced by the Commander, Aberdeen Proving Ground, and such agencies as he/she may designate.

(k) Compliance with Federal, State and county laws required. The taking of fish and crabs in the waters of Aberdeen Proving Ground Reservation and the setting of and location of nets, in a manner not in compliance with Federal, State, and county laws is prohibited.

§334.150 Severn River at Annapolis, Md.; experimental test area, U.S. Navy Marine Engineering Laboratory. (a) The restricted area. The waters of Severn River shoreward of a line beginning at the southeasternmost corner of the U.S. Navy Marine Engineering Laboratory sea wall and running thence southwesterly perpendicular to the main Severn River channel, approximately 560 feet, thence northwesterly parallel to and 50 feet shoreward of the edge of the channel, 1,035 feet, and thence northeasterly perpendicular to the channel, approximately 600 feet, to the shore. Spar buoys will mark the corners of the area adjacent to the channel.

(b) The regulations. (1) No vessel or person other than specifically authorized military and naval vessels and persons shall enter or remain in the area during its use for experimental purposes. At all other times vessels and persons may use the area without restriction.

(2) The area will be in use intermittently, and this use will be signified by the presence of white-painted boats or floats, which will be lighted at night.

(3) Upon observing the boats or floats referred to in paragraph (b)(2) of this section, or upon being warned, vessels and persons shall immediately vacate the area and remain outside the area during the period of use.

(4) The regulations in this section shall be enforced by the Commandant, Severn River Naval Command, and such agencies as he may designate.

§334.160 Severn River, at U.S. Naval Academy Santee Basin, Annapolis, Md.; naval restricted area. (a) The area. The waters within the U.S. Naval Academy Santee Basin and adjacent waters of Severn River inclosed by a line beginning at the northeast corner of Dewey Field seawall; thence to latitude 38°59′03″, longitude 76°28′47.5″; thence to latitude 38°58′58″, longitude 76°28′40″; and thence to the northwest corner of Farragut Field seawall.

(b) The regulations. (1) No person in the water, vessel or other craft shall enter or remain in the restricted area at any time except as authorized by the enforcing agency.

(2) The regulations in this section shall be enforced by the Superintendent, U.S. Naval Academy, Annapolis, Md., and such agencies as he may designate.

§334.170 Chesapeake Bay, in the vicinity of Chesapeake Beach, Md.; firing range, Naval Research Laboratory. (a) The danger zone–(1) Area A. A roughly rectangular area bounded on the north by latitude 38°39′55″; on the south by latitude 38°39′09″; on the east by longitude 76°31′03″; and on the west by the shore of Chesapeake Bay.

(2) Area B. The sector of a circle bounded by radii of 9,600 yards bearing 31° (to Bloody Point Bar Light) and 137°30′ (to Choptank River Approach Buoy 2), respectively, from the center at the southeast corner of building No. 3; excluding Area A.

(3) Area C. The segment of a circle inclosed by the arcs of two circles having radii of 9,600 yards and 13,200 yards, respectively, and bounded by the extended radii marking the north and south limits of Area B.

Note: All bearings referred to true meridian.

(4) Area D. A roughly rectangular area bounded on the north by an east-west line through Chesapeake Beach Light 2 at the entrance channel to Fishing Creek; on the south by an east-west line through Plum Point Shoal Buoy 1 northeast from Breezy Point; on the east by the established fishing structure limit line; and on the west by the shore of Chesapeake Bay.

(b) The regulations. No vessel shall enter or remain in Area A at any time.

(2) No vessel shall enter or remain in Area B or Area C between the hours of 1:00 p.m. and 5:00 p.m. daily except Sundays, except that through navigation of commercial craft will be permitted in Area C at all times, but such vessels shall proceed on their normal course and shall not delay their progress.

(3) No fishing structures, other than those presently in established locations, which may be maintained, will be permitted to be established in Area D without specific permission from the Commanding Officer, Naval Research Laboratory.

(4) The areas will be in use throughout the year, and no further notice is contemplated that firing is continuing.

(5) Prior to the conduct of each firing practice a patrol vessel will patrol the range to warn navigation. "Bravo" will be flown from a conspicuous point on the patrol vessel and from a prominent position on shore.

(6) This section shall be enforced by the Commander, Naval Base, Norfolk, Virginia, and such agencies as he/she may designate.

§334.180 Patuxent River, Md.; restricted areas, U.S. Naval Air Test Center, Patuxent River, Md. (a) Except in the gut off the tip of Point Patience, no person in the water and no craft shall approach closer than 75 yards to the beaches, shoreline, or piers of the area formerly occupied by the U.S. Naval Mine Warfare Test Station, or of U.S. Naval Air Station property. A person in the water or a civilian craft shall not approach rafts, barges, or platforms closer than 100 yards.

(b) Diving tenders will exhibit a square red flag with white X when underwater diving takes place from naval small craft. At such times, persons in the water and civilian craft shall stay at least 200 yards clear of these vessels and the civilian craft shall proceed at a speed not greater than five knots when within 1,000 yards thereof.

(c) On occasions, seaplane landings and takeoffs will be practiced in the seadrome area north of the U.S. Naval Air Station, Patuxent River. This area includes those waters of the Patuxent River between Town Point and Hog Point shoreward of a line described as follows: Beginning at a point on the shore just west of Lewis Creek, bearing 161°30′ true, 2,000 yards from Patuxent River Light 8; thence to a point bearing 130° true, 1,850 yards from Patuxent River Light 8; thence to a point bearing 247°30′ true, 3,650 yards from Drum Point Light 2; thence to a point bearing 235° true, 2,060 yards from Drum Point Light 2; thence to a point bearing 129° true, 700 yards from Drum Point Light 2; thence to a point bearing 137° true, 1,060 yards from Drum Point Light 2; and thence to a point on the shore west of Harper Creek entrance, bearing 158°30′ true, 1,900 yards from Drum Point Light 2. Operations will be indicated by day by a square white flag with square blue center, and by night by one green light for operations in an easterly direction, or by two vertical green lights for operations in a westerly direction, all signals to be exhibited from Patuxent River Boathouse seawall at the U.S. Naval Air Test Center. In addition, crash boats will patrol the landing lanes during the operations, and by night float lights will mark the landing lanes. At such times as the above signals are exhibited the following restriction will apply to boating and to persons in the waters adjacent to the U.S. Naval Air Station in the area westward of Fishing Point: Persons in the water and boats will proceed across the seaplane operating area only in accordance with instructions from crash boats; will not enter the seaplane basins; and will not use the areas adjacent to seaplane basins.

(d) The regulations in this section shall be enforced by the Commanding Officer, U.S. Naval Air Station, Patuxent River, Md., and such agencies as he may designate.

§334.190 Chesapeake Bay, in vicinity of Bloodsworth Island, Md.; shore bombardment, air bombing, air strafing, and rocket firing area, U.S. Navy.

(a) **The areas**–(1) **Prohibited area.** All waters within a circle 0.5-mile in radius with its center at latitude 38°10′00″, longitude 76°06′00″.

(2) **The danger zone.** All waters of Chesapeake Bay and Tangier Sound within an area bounded as follows: Beginning at latitude 38°08′15″, longitude 76°10′00″; thence to latitude 38°12′00″, longitude 76°10′00″; thence to latitude 38°12′00″, longitude 76°07′00″; thence to latitude 38°13′00″, longitude 76°06′00″; thence to latitude 38°13′00″, longitude 76°04′00″; thence to latitude 38°12′00″, longitude 76°02′00″; thence to latitude 38°12′00″, longitude 76°00′00″; thence to latitude 38°08′15″, longitude 76°00′00″; thence to the point of beginning, excluding the prohibited area described in paragraph (a) (1) of this section.

(b) **The regulations.** (1) Vessels or other craft shall not enter or remain in the prohibited area at any time unless authorized to do so by the enforcing agency.

(2) No vessel or other craft shall enter or remain in the danger zone when notified by the enforcing authority to keep clear or when firing is or will soon be in progress, except as provided in paragraph (b)(5) of this section.

(3) Advance notice will be given of the dates and times of all firings in the danger zone and such notice will be published in the local "Notice to Mariners." The area will be in use intermittently throughout the year. On days when firing is conducted, firing will take place normally between sunrise and 12 midnight.

(4) Prior to the commencement of firing each day in the danger zone, surface or air search of the entire area will be made for the purpose of locating and warning all craft and persons not connected with the firing, and a patrol will be maintained throughout the duration of firing.

(5) Warning that ships are firing or soon will be firing in the danger zone will be indicated during daylight by a red flag prominently displayed from a control tower on Adams Island at latitude 38°09′06″, longitude 76°05′22″, and at night by a white light on top of the control tower. Warning that aircraft are firing or soon will be firing will be indicated by the aircraft patrolling the area. All persons, vessels, or other craft shall clear the area when these signals are displayed or when warned by patrol vessels or by aircraft employing the method of warning known as "buzzing" which consists of low flight by the airplane and repeated opening and closing of the throttle. As an additional warning to crabbing, fishing, and other small craft, and vessels, the control tower on Adams Island will broadcast firing intentions on citizens band radio using channels 11 and 12.

(6) During hours when firing is in progress or is about to commence, no fishing or oystering vessels or other craft not directly connected with the firing shall navigate within the danger zone, except that deep-draft vessels proceeding in established navigation lanes and propelled by mechanical power at a speed greater than 5 knots normally will be permitted to traverse the area. When ships are firing or soon will be firing in the danger zone, permission for such deep-draft vessels to enter and traverse the area will be indicated during daylight by dipping the red warning flag to half-mast, and at night flashing the warning searchlight. When aircraft are firing or soon will be firing in the danger zone, such deep-draft vessels may proceed unless warned to stay clear of the area by the method of warning known as "buzzing."

(7) When firing is not in progress or is not about to commence, oystering and fishing boats and other craft may operate within the danger zone.

(8) All projectiles, bombs, and rockets will be fired to land on Bloodsworth Island or Pone Island, but Naval authorities will not be responsible for damage by such projectiles, bombs, or rockets, or by Navy or Coast Guard vessels, to nets, traps, buoys, pots, fish pounds, stakes, or other equipment which may be located within the danger zone.

(9) The regulations in this section shall be enforced by the Commander, Naval Base, Norfolk, Virginia, and such agencies as he/she may designate.

§334.200 Chesapeake Bay, Point Lookout to Cedar Point; aerial firing range and target areas, U.S. Naval Air Test Center, Patuxent River, Md. (a) Aerial firing range–(1) The danger zone. The waters of Chesapeake Bay

within an area described as follows: Beginning at the easternmost extremity of Cedar Point; thence easterly to the southern tip of Barren Island; thence southeasterly to latitude 38°01′15″, longitude 76°05′33″; thence southwesterly to latitude 37°59′25″, longitude 76°10′54″; thence northwesterly to latitude 38°02′20″, longitude 76°17′26″; thence northerly to Point No Point Light; thence northwesterly to the shore at latitude 38°15′45″; thence northeasterly along the shore to the point of beginning. Aerial firing and dropping of nonexplosive ordnance will be conducted in this area throughout the year, Monday through Saturday, except national holidays.

(2) The regulations. (i) Through navigation of surface craft outside the target areas will be permitted at all times. Vessels shall proceed on their normal course and shall not delay their progress.

(ii) Prior to firing or ordnance drops, the range will be patrolled by naval surface craft or aircraft to warn watercraft likely to be endangered. Surface craft so employed will display a square red flag. Naval aircraft will use a method of warning consisting of repeated shallow dives in the area, following each dive by a sharp pullup.

(iii) Any watercraft under way or at anchor, upon being so warned, shall immediately vacate the area and shall remain outside the area until conclusion of firing practice.

(iv) Nothing in this section shall prevent the taking of shellfish or the setting of fishing structures within the range outside target areas in accordance with Federal and State regulations; Provided, That no permanent or temporary fishing structures or oyster ground markers shall be placed on the western side of the Chesapeake Bay between Point No Point and Cedar Point without prior written approval of the Commanding Officer, U.S. Naval Air Station, Patuxent River, Md.

(v) Naval authorities will not be responsible for damage caused by projectiles, bombs, missiles, or Naval or Coast Guard vessels to fishing structures or fishing equipment which may be located in the aerial firing range immediately adjacent to the target areas.

(b) Target areas–(1) Prohibited area. A circular area with a radius of 1,000 yards having its center at latitude 38°13′00″, longitude 76°19′00″ identified as Hooper Target.

(2) Restricted area. A circular area with a radius of 600 yards having its center at latitude 38°02′18″, longitude 76°09′26″, identified as Hannibal Target.

(3) The regulations. Nonexplosive projectiles and bombs will be dropped at frequent intervals in the target areas. Hooper Target shall be closed to navigation at all times and Hannibal Target during daylight hours, except for vessels engaged in operational and maintenance operations as directed by the Commanding Officer, U.S. Naval Air Station, Patuxent River, Md. No person in the waters, vessel, or other craft shall enter or remain in the closed area except on prior written approval of the Commanding Officer, U.S. Naval Air Station, Patuxent River, Md.

(c) The regulations in this section shall be enforced by the Commander, Naval Air Test Center, and such agencies as he may designate.

§334.210 Chesapeake Bay, in vicinity of Tangier Island; Naval guided missiles test operations area. (a) The danger zone–(1) Prohibited area. A circle 1,000 yards in radius with its center at latitude 37°47′54″, longitude 76°03′48″.

(2) Restricted area. A circle three nautical miles in radius with its center at latitude 37°47′54″, longitude 76°03′48″, excluding the prohibited area.

(b) The regulations. (1) Vessels or other craft shall not enter or remain in the prohibited area at any time unless authorized to do so by the enforcing agency.

(2) Except as otherwise provided in paragraph (b) (6) of this section, vessels or other craft shall not enter or remain in the restricted area when firing is or will soon be in progress unless authorized to do so by the enforcing agency.

(3) Advance notice will be given of the date on which the first firing is to be conducted and such notice will be published in "Notice to Mariners." Thereafter, the danger zone will be in use intermittently throughout the year and no further notice is contemplated that firing is continuing.

(4) Warning that firing is or will soon be in progress will be indicated by a red flag displayed from one of six dolphin platforms on the perimeter of the prohibited area, and by patrol vessels within the danger zone or by aircraft employing the method of warning known as "buzzing" which consists of low flight by the airplane and repeated opening and closing of the throttle. Surface or air search of the entire area will be made prior to the commencement of firing on each scheduled day. During periods of firing a patrol vessel will remain in the approaches to the restricted area and maintain continuous contact with the firing planes to warn when the area is not clear.

(5) Upon observing the warning flag or upon receiving a warning by any of the patrol vessels or aircraft, vessels or other craft shall immediately vacate the restricted area and remain outside the area until the conclusion of firing for the day.

(6) This section shall not deny traverse of portions of the restricted area by commercial craft proceeding in established steamer lanes, but when firing is or will soon be in progress all such craft shall proceed on their normal course through the area with all practicable speed.

(7) All projectiles, bombs and rockets will be fired to land within the prohibited area, and on or in the immediate vicinity of a target in the restricted area located adjacent to the west side of Tangier Island. The Department of the Navy will not be responsible for damages by such projectiles, bombs, or rockets to nets, traps, buoys, pots, fishpounds, stakes, or other equipment which may be located within the restricted area.

(8) The regulations of this section shall be enforced by the Commander, Naval Air Bases, Fifth Naval District, Norfolk, Virginia, and such agencies as he may designate.

§334.220 Chesapeake Bay, South of Tangier Island, Virginia; naval firing range. (a) The danger zone. Beginning at latitude 37°46′39″, longitude 75°57′43″, thence to latitude 37°43′42″, longitude 75°55′30″; thence to latitude 37°27′00″, longitude 76°02′48″; thence to latitude 37°27′00″, longitude 76°08′00″; thence to latitude 37°45′00″, longitude 76°09′48″; thence to latitude 37°45′00″, longitude 76°08′51″; and thence along the circumference of a circle of five nautical miles radius whose center is at latitude 37°47′54″, longitude 76°03′48″, to the point of beginning.

(b) The regulations. (1) Any vessel propelled by mechanical means or by sail at a speed greater than five knots may proceed through the danger zone to and from points without, but not from one point to another point within, the area, except when especially notified to the contrary.

(2) All vessels, other than naval craft, are forbidden to anchor within the danger zone except in cases of great emergency. All vessels anchoring under circumstances of great emergency within the area shall leave the area immediately after the emergency ceases or upon notification by the enforcing agency.

(3) Fishing, oystering, clamming, crabbing, and other aquatic activities are forbidden within the limits of the danger zone, except that existing fishing structures licensed by the State of Virginia may be maintained and operated;

Provided, The owners thereof obtain written permits from the enforcing agency designated in paragraph (b)(5) of this section.

(4) Day and night firing over the range will be conducted intermittently by one or more vessels, depending on weather and operating schedules. When firing is in progress, adequate patrol by naval craft will be conducted to prevent vessels from entering or remaining within the danger zone.

(5) This section shall be enforced by the Commandant, Fifth Naval District, U.S. Naval Base, Norfolk, Virginia, and such agencies as he may designate.

§334.230 Potomac River. (a) Naval Surface Weapons Center, Dahlgren, Virginia–(1) The danger zone–

(i) Lower zone. The entire portion of the lower Potomac River between a line from Point Lookout, Md., to Smith Point, Va., and a line from Buoy 14 (abreast of St. Clements Island) to a point near the northeast shore of Hollis Marsh at latitude 38°10′00″, longitude 76°45′23.5″. Long-range and aerial machine gun firing is normally conducted in this zone at infrequent intervals.

(ii) Middle zone. Beginning at the intersection of the Potomac River Bridge with the Virginia shore; thence to Light 33; thence to latitude 38°19′06″, longitude 76°57′07″, which point is about 3,300 yards east-southeast of Light 30; thence to Line of Fire Buoy O, about 1,150 yards southwesterly of Swan Point; thence to Line of Fire Buoy M, about 1,700 yards south of Potomac View; thence to Line of Fire Buoy K, about 1,400 yards southwesterly of the lower end of Cobb Island; thence to Buoy 14, abreast of St. Clements Island; thence southwesterly to a point near the northeast shore of Hollis Marsh at latitude 38°10′00″, longitude 76°45′23.5″; thence northwesterly to Line of Fire Buoy J, about 3,000 yards off Popes Creek, Va; thence to Line of Fire Buoy L, about 3,600 yards off Church Point; thence to Line of Fire Buoy N, about 900 yards off Colonial Beach; thence to Line of Fire Buoy P, about 1,000 yards off Bluff Point; thence northwest to latitude 38°17′52″, longitude 77°01′00″, a point of the Virginia shore on property of Naval Surface Weapons Center, a distance of about 3,800 yards; thence northerly along the shore of the Naval Surface Weapons Center to Baber Point, latitude 38°18′42″, longitude 77°01′45″, and thence north-northwest to latitude 38°19′09″, longitude 77°02′08″, a point on the Main Dock at the Naval Surface Weapons Center. Firing is normally conducted in this zone daily except Saturdays, Sundays, and national holidays.

(iii) Upper zone. Beginning at Mathias Point, Va; thence north to Light 5; thence in a northeasterly direction to Light 6; thence east-southeast to Lighted Buoy 2, thence east-southeast to a point on the Maryland shore at approximately latitude 38°23′35″, longitude 76°59′18″; thence southerly with the Maryland shore to a line passing through Light 1 to the Virginia shore, parallel to the Potomac River Bridge; thence northerly with the Virginia shore to the point of beginning. Aerial bombing and strafing is normally conducted in this zone at infrequent intervals.

(2) The regulations. (i) Firing normally takes place between the hours of 8:00 am. and 4:00 p.m. daily except Saturdays, Sundays, and national holidays, with infrequent night firing between 4:00 p.m. and 10:30 p.m. During a national emergency, firing will take place between the hours of 6:00 a.m. and 10:30 p.m. daily except Sundays.

(ii) When firing is in progress, no fishing or oystering vessels shall operate within the danger zone affected unless so authorized by the Naval Surface Weapons Center's patrol boats. Oystering and fishing boats or other craft may cross the river in the danger zone only after they have reported to the patrol boats and received instructions as to when and where to cross. Deep-draft vessels using dredged channels and propelled by mechanical power at a speed greater than five miles per hour may proceed directly through the danger zones without restriction except when especially notified to the contrary. Unless instructed to the contrary by the patrol boat, small craft navigating up or down the Potomac River during firing hours shall proceed outside of the northeastern boundary of the Middle Danger Zone. All craft desiring to enter the Middle Danger Zone when proceeding in or out of Upper Machodoc Creek during firing hours will be instructed by the patrol boat; for those craft which desire to proceed in or out of Upper Machodoc Creek on a course between the western shore of the Potomac River and a line from the Main Dock of the Naval Surface Weapons Center to Line of Fire Buoy P, clearance will be granted to proceed upon request directed to the patrol boat.

(iii) The regulations in this section shall be enforced by the Commander, Naval Surface Weapons Center and such agencies as he/she may designate. Patrol boats, in the execution of their mission assigned herein, shall display a square red flag during daylight hours for purposes of identification; at night time, a 32 point red light shall be displayed at the mast head. The Naval Surface Weapons Center (Range Control) can be contacted by Marine VHF radio (Channel 16) or by telephone (703) 663-8791.

(b) Accotink Bay, Accotink Creek, and Pohick Bay; United States Military Reservation, Fort Belvoir, Va.–(1) The danger zone. The waters of Accotink Bay, Accotink Creek, and Pohick Bay, Virginia, within and adjacent to the target ranges of the United States Military Reservation, Fort Belvoir, as follows: All of Accotink Bay; all of Accotink Creek below the bridge which crosses Accotink Creek approximately 400 yards south of U.S. Highway No. 1; and that portion of Pohick Bay bordering its north shore. The mouth of Accotink Bay and that portion of Pohick Bay within the danger zone will be marked by the Post Commander with suitable warning buoys.

(2) The regulations. (i) When firing affecting the area is in progress, the Post Commander 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 be seen in the danger zone. When firing is in progress, the Post Commander will cause to be displayed both on the east shore of Accotink Bay at its mouth and near the danger zone boundary on Accotink Creek a red streamer which shall be visible to a person in a boat near those points.

(ii) Persons desiring to cross the waters in the danger zone shall first determine whether a red streamer is displayed on the east Shore of Accotink Bay at its mouth or near the danger zone boundary on Accotink Creek. If the red streamer is displayed, it will indicate that firing is in progress and that the waters in the danger zone are covered by rifle fire, and the area shall not be entered until the streamer is lowered.

(iii) The Post Commander is hereby authorized by using such agencies and equipment necessary to stop all boats at the boundary of the danger zone and prohibit their crossing the area until convenient to the the firing schedule to do so.

§334.240 Potomac River, Mattawoman Creek and Chicamuxen Creek; U.S. Naval Propellant Plant, Indian Head, Md. (a) The danger zone. Beginning at a point on the easterly shore of the Potomac River at latitude 38°36′00″, longitude 77°11′00″; thence to latitude 38°34′30″, longitude 77°13′00″; thence to latitude 38°33′20″, longitude 77°14′20″; thence to latitude 38°32′20″, longitude 77°15′10″; thence to latitude 38°32′00″, longitude 77°15′0″; thence to latitude 38°32′00″, longitude 77°14′40″; thence to

latitude 38°32′30″, longitude 77°14′00″; thence upstream along the easterly shoreline of Chicamuxen Creek to its head; thence downstream along the westerly shoreline of Chicamuxen Creek to the southernmost point of Stump Neck; thence northeasterly along the shoreline of Stump Neck to the mouth of Mattawoman Creek; thence along the southeasterly shore of Mattawoman Creek to the pilings remaining from the footbridge connecting the left bank of the creek to the Naval Ordnance Station; thence along the northwesterly shore of Mattawoman Creek from the pilings remaining from the footbridge to the mouth of the creek; thence in a northeasterly direction along the easterly shore of the Potomac River to the point of beginning.

(b) The regulations. (1) Firings consisting of controlled explosions within the danger zone, and controlled shore operations, or accidental explosions, hazardous to vessel traffic within the limits of the danger zone, may take place at any time of the day or night and on any day of the week.

(2) Flashing red lights, horns, and signs established at appropriate points will warn vessels of impending tests or operations considered to be hazardous to vessels within the danger zone.

(3) No vessel except vessels of the United States or vessels authorized by the enforcing agency shall enter or remain in the danger zone while lights are flashing, when warning horns are in operation, or when warned or directed by a patrol vessel.

(4) Nothing in this section shall prohibit the use of Mattawoman Creek or Chicamuxen Creek as a harbor of refuge because of stress of weather.

(5) Except as prescribed in paragraph (b)(3) of this section, vessels may enter and proceed through the danger zone without restriction; however, accidental explosions may occur at any time and vessels entering the area do so at their own risks.

(6) Fishermen operating in the danger zone when warning signals are sounded shall evacuate the area immediately.

(7) The regulations in this section shall be enforced by the Commanding Officer, U.S. Naval Ordnance Station, Indian Head, Maryland.

§334.250 Gunston Cove, at Whitestone Point, Va.; U.S. Army restricted area. (a) The area. The waters within an area beginning at a point on the shoreline at longitude 77°08′36″; thence to latitude 38°40′22″, longitude 77°08′39″; thence to latitude 38°40′14″, longitude 77°08′22″; thence to a point on the shoreline at longitude 77°08′18″ and thence along the shoreline to the point of beginning.

(b) The regulations. No person, vessel, or other craft shall enter or remain in the area at any time except as authorized by the enforcing agency.

(c) The regulations in this section shall be enforced by the District Engineer, U.S. Army Engineer District, Philadelphia, Pa., and such agencies as he may designate.

§334.260 York River, Va.; naval prohibited and restricted areas. (a) The areas–(1) Naval mine service-testing area (prohibited). A rectangular area surrounding Piers 1 and 2, Naval Weapons Station, and extending upstream therefrom, beginning at a point on the shore line at latitude 37°15′25″ N., longitude 76°32′32″ W.; thence to latitude 37°15′42″ N., longitude 76°32′06″ W.; thence to latitude 37°15′27″ N., longitude 76°31′48″ W.; thence to latitude 37°15′05″ N., longitude 76°31′27″ W.; thence to a point on the shore line at latitude 37°14′51″ N., longitude 76°31′50″ W.; and thence along the shore line to the point of beginning.

(2) Naval mine service-testing area (restricted). A rectangular area adjacent to the northeast boundary of the prohibited area described in subparagraph (1) of this paragraph, beginning at latitude 37°16′00″ N., longitude 76°32′29″ W.; thence to latitude 37°16′23″ N., longitude 76°32′00″ W.; thence to latitude 37°15′27″ N., longitude 76°30′54″ W.; thence to latitude 37°15′05″ N., longitude 76°31′27″ W.; thence to latitude 37°15′27″ N., longitude 76°31′48″ W.; thence to latitude 37°15′42″ N., longitude 76°32′06″ W.; thence to latitude 37°15′40″ N., longitude 76°32′09″ W.; and thence to the point of beginning.

(3) Explosives-Handling Berth (Naval). A circular area of 600 yards radius with its center at latitude 37°13′56″ N., longitude 76°28′48″ W.

(b) The regulations. (1) All persons and all vessels other than naval craft are forbidden to enter the prohibited area described in paragraph (a)(1) of this section.

(2) Trawling, dragging, and net-fishing are prohibited, and no permanent obstructions may at any time be placed in the area described in paragraph (a) (2) of this section. Upon official notification, any vessel anchored in the area and any person in the area will be required to vacate the area during the actual mine-laying operation. Persons and vessels entering the area during mine-laying operations by aircraft must proceed directly through the area without delay, except in case of emergency. Naval authorities are required to publish advance notice of mine-laying and/or retrieving operations scheduled to be carried on in the area, and during such published periods of operation, fishing or other aquatic activities are forbidden in the area. No vessel will be denied passage through the area at any time during either mine-laying or retrieving operations.

(3) The Explosives-Handling Berth (Naval) described in paragraph (a)(3) of this section is reserved for the exclusive use of naval vessels and except in cases of emergency no other vessel shall anchor therein without the permission of local naval authorities, obtained through the Captain of the Port, U.S. Coast Guard, Norfolk, Va. There shall be no restriction on the movement of vessels through the Explosive-Handling Berth.

(4) Vessels shall not be anchored, nor shall persons in the water approach within 300 yards of the perimeter of the Explosives-Handling Berth when that berth is occupied by a vessel handling explosives.

(5) The regulations of this section shall be enforced by the Commander, Naval Base, Norfolk, Virginia, and such agencies as he may designate.

§334.270 York River adjacent to Cheatham Annex Depot, Naval Supply Center, Williamsburg, Virginia; restricted area. (a) The area. The waters of York River bounded as follows: Beginning at a point on shore at Cheatham Annex Depot at latitude 37°17′14″ N., longitude 76°35′38″ W.; thence to a point offshore at latitude 37°17′52″ N., longitude 76°35′20″ W.; thence approximately parallel to the shore to a point at latitude 37°17′23″ N., longitude 76°34′39″ W.; thence to the shore at latitude 37°16′58″ N., longitude 76°35′03″ W.; and thence along the shore at Cheatham Annex Depot to the point of beginning.

(b) The regulations. (1) No loitering will be permitted within the area. Oystermen may work their own leaseholds or public bottom within the area, provided they obtain special permission from the Officer in Charge, Cheatham Annex Depot, Naval Supply Center, Williamsburg, Virginia.

(2) The regulations in this section shall be enforced by the Officer in Charge, Cheatham Annex Depot, U.S. Naval Supply Center, Williamsburg, Virginia.

§334.280 James River between the entrance to Skiffes Creek and Mulberry Point, Va.; Army training and small craft testing area. (a) The restricted area. Beginning on the shore at latitude 37°09′54″N., longitude 76°36′25″W.;

thence westerly to latitude 37°09′50″N., longitude 76°37′45.5″W.; thence southerly to latitude 37°09′00″N., longitude 76°38′05″W.; thence southerly to latitude 37°08′22″N., longitude 76°37′55″W.; thence due east to the shore at latitude 37°08′22″N., longitude 76°37′22″W.; thence northerly along the shore to the point of beginning.

(b) The regulations. (1) No vessels other than Department of the Army vessels, and no persons other than persons embarked in such vessels shall remain in or enter the restricted area except as provided in paragraph (b)(2) of this section.

(2) Nothing in the regulations of this section shall prevent the harvesting and cultivation of oyster beds or the setting of fish traps within the restricted area under regulations of the Department of the Army, nor will the passage of fishing vessels to or from authorized traps be unreasonably interfered with or restricted.

(3) Vessels anchored in the area shall be so anchored as not to obstruct the arc of visibility of Deepwater Shoals Light.

(4) The Commanding General, Fort Eustis, Va., will, to the extent possible give public notice from time to time through local news media and the Coast Guard's Local Notice to Mariners of the schedule of intended Army use of the restricted area.

(5) The continuation of the restricted area for more than 3 years after the date of its establishment shall be dependent upon the outcome of the consideration of a request for its continuance submitted to the District Engineer, U.S. Army Engineer District, Norfolk, Virginia, by the using agency at least 3 months prior to the expiration of the 3 years.

(6) The regulations in this section shall be enforced by the Commanding General, Fort Eustis, Va., and such agencies as he may designate.

§334.290 Elizabeth River, Southern Branch, Va., naval restricted areas. (a) The areas–(1) St. Helena Annex Area. Beginning at a point at St. Helena Annex of the Norfolk Naval Shipyard, on the eastern shore of Southern Branch of Elizabeth River, at latitude 36°49′43″, longitude 76°17′26.5″; thence in a southwesterly direction to a point on the eastern boundary of Norfolk Harbor 40-foot channel at latitude 36°49′42″, longitude 76°17′33″; thence in a southerly direction along the eastern boundary of Norfolk Harbor 40-foot channel to latitude 36°49′28″, longitude 76°17′27″; thence easterly to the shore at latitude 36°49′28″, longitude 76°17′22″; and thence, northerly along the shore to the point of beginning.

(2) Norfolk Naval Shipyard Area. Beginning at a point on the shore at the northeast corner of the Norfolk Naval Shipyard, at latitude 36°49′43.5″, longitude 76°17′41.5″; thence due east approximately 100 feet to the western boundary of Elizabeth River channel; thence in a southerly direction along the western boundary of the channel to the point where it passes through the draw of the Norfolk and Portsmouth Belt Line Railroad bridge, thence in a southwesterly direction along the northerly side of the bridge to the western shore of Southern Branch of Elizabeth River; and thence along the shore in a northerly direction to the point of beginning.

(3) Southgate Terminal Area. Beginning at a point at the northeast corner of Southgate Terminal Annex of Norfolk Naval Shipyard, at latitude 36°48′23″, longitude 76°17′39″; thence east to latitude 36°48′23″, longitude 76°17′29″; thence southerly along the western boundary of Norfolk Harbor 35-foot channel to latitude 36°48′04″, longitude 76°17′33″; thence west to latitude 36°48′04″, longitude 76°17′41″; and thence along the shore in a northerly direction to the point of beginning.

(b) The regulations. (1) No vessels other than Naval vessels and other vessels authorized to move to and from piers at the Norfolk Naval Shipyard and its two annexes described in paragraph (a) (1) and (3) of this section, and no person other than persons embarked in such vessels, shall enter the restricted areas.

(2) This section shall be enforced by the Commander, Norfolk Naval Shipyard, Portsmouth, Va., and such agencies as he may designate.

§334.300 Hampton Roads and Willoughby Bay, off Norfolk Naval Base; naval restricted area. (a) The area. Beginning at a point on shore at the Destroyer Submarine Piers at latitude 36°56′00″N., longitude 76°19′30″W.; thence westerly to 36°55′59″N., 76°20″08.5″W.; thence northerly along the eastern limit of Norfolk Harbor Channel to 36°57′52″N., 76°20′00″W.; thence easterly to 36°57′52″N., 76°19′35″W.; thence to 36°57′47.7″N., 76°18′57″W.; thence southeasterly to 36°57′26″N., 76°18′42″W.; thence easterly to 36°57′26.2″N., 76°17′55.2″W.; thence southerly to 36°57′05″N., 76°17′52″W.; thence southeasterly to 36°56′56.2″N., 76°17′27″W.; thence northeasterly to 36°57′10″N., 76°16′29″W.; and thence to the shoreline at 36°57′18.8″N., 76°16′22″W.; at the Naval Air Station.

(b) The regulations. (1) No vessels other than Naval vessels and other vessels authorized to move to and from piers at the Norfolk Naval Base, and no person other than persons embarked in such vessels, shall enter the restricted areas.

(2) This section shall be enforced by the Commander, Naval Base, Norfolk, Virginia, and such agencies as he/she may designate.

§334.310 Chesapeake Bay, Lynnhaven Roads; Navy amphibious training area. (a) The restricted area. Beginning at latitude 36°55′47″, longitude 76°11′04.5″; thence to latitude 36°59′04″, longitude 76°10′11″; thence to latitude 36°58′28.5″, longitude 76°07′54″; thence to latitude 36°55′27.5″, longitude 76°08′42″; thence westerly along the shore and across the mouth of Little Creek to the point of beginning.

(b) The regulations. (1) No fishpound stakes or structures shall be allowed in the restricted area.

(2) No vessel shall approach within 300 yards of any naval vessel or within 600 yards of any vessel displaying the red "baker" burgee.

(3) This section shall be enforced by the Commandant, Fifth Naval District, and such agencies as he may designate.

§334.320 Chesapeake Bay entrance; naval restricted area. (a) The area. Beginning at a point on the south shore of Chesapeake Bay at longitude 76°03′06″; thence to latitude 37°01′18″, longitude 76°02′06″; thence to latitude 37°00′18″, longitude 75°55′54″; thence to latitude 36°58′00″, longitude 75°48′24″; thence to latitude 36°51′48″, longitude 75°51′00″; thence to the shore at longitude 75°58′48″, and thence northwesterly and southwesterly along the shore at Cape Henry to the point of beginning.

(b) The regulations. (1) Anchoring, trawling, crabbing, fishing, and dragging in the area are prohibited, and no object attached to a vessel or otherwise shall be placed on or near the bottom.

(2) This section shall be enforced by the Commandant, Fifth Naval District, Norfolk, Va.

§334.330 Atlantic Ocean and connecting waters in vicinity of Myrtle Island, Va.; Air Force practice bombing, rocket firing, and gunnery range. (a) The danger zone. The waters of the Atlantic Ocean and connecting waters within an area described as follows: Beginning at latitude

37°12′18″, longitude 75°46′00″; thence southwesterly to latitude 37°08′21″, longitude 75°50′00″; thence northwesterly along the arc of a circle having a radius of three nautical miles and centered at latitude 37°11′16″, longitude 75°49′29″, to latitude 37°10′14″, longitude 75°52′57″; thence northeasterly to latitude 37°14′30″, longitude 75°48′32″; thence southeasterly to 37°13′38″, longitude 75°46′18″; and thence southeasterly to the point of beginning.

(b) The regulations. (1) No vessel shall enter or remain in the danger zone except during intervals specified and publicized from time to time in local newspapers or by radio announcement.

(2) This section shall be enforced by the Commanding General, Tactical Air Command, Langley Air Force Base, Virginia, and such agencies as he may designate.

§334.340 Chesapeake Bay off Plumtree Island, Hampton, Va.; Air Force precision test area. (a) The danger zone. The waters of Chesapeake Bay and connecting waters within an area bounded as follows: Beginning at latitude 37°08′12″, longitude 76°19′30″, which is a point on the circumference of a circle of 10,000-foot radius with its center on Plumtree Point at latitude 37°07′30″, longitude 76°17′36″; thence clockwise along the circumference of the circle to latitude 37°09′06″, longitude 76°18′00″; thence southeasterly to latitude 37°08′12″, longitude 76°17′48″; thence clockwise along the circumference of a circle of 4,000-foot radius (with its center at latitude 37°07′30″, longitude 76°17′36″ to latitude 37°07′48″, longitude 76°18′24″; thence northwesterly to the point of beginning.

(b) The regulations. (1) The danger zone will be in use not more than a total of 4 hours per month, which hours shall be during not more than any 2 days per month.

(2) No vessel shall enter or remain in the danger zone during periods of firing or bombing or when the zone is otherwise in use.

(3) The Commander, Tactical Air Command, Langley Air Force Base, Va., shall be responsible for publicizing in advance through the Coast Guard's "Local Notice to Mariners," in the local press, and by radio from time to time the schedule of use of the area, and shall station patrol boats to warn vessels during periods of use.

(4) This section shall be enforced by the Commander, Tactical Air Command, Langley Air Force Base, Va., or such agency as he may designate.

(c) Disestablishment of danger zone. The danger zone will be disestablished not later than December 31, 1967, unless written application for its continuance shall have been made to and approved by the Secretary of the Army prior to that date.

§334.350 Chesapeake Bay off Fort Monroe, Va.; firing range danger zone. (a) The danger zone. All of the water area lying within a section extending seaward a distance of 4,600 yards between radial lines bearing 83° True and 115° True, respectively, from a point on shore at latitude 37°01′30″ N., longitude 76°17′54″ W.

(b) The regulations. (1) No weapon having a greater range than the 30-calibre carbine is to be fired into the firing range danger zone.

(2) During periods when firing is in progress, red flags will be displayed at conspicuous locations on the beach. Observers will be on duty and firing will be suspended as long as any vessel is within the danger zone.

(3) Passage of vessels through the area will not be prohibited at any time, nor will commercial fishermen be prohibited from working fish nets within the area. No loitering or anchoring for other purposes will be permitted during announced firing periods.

(4) No firing will be done during hours of darkness or low visibility.

(5) The Commander, Fort Monroe, Va., is responsible for furnishing in advance the firing schedule to the Commander, 5th Coast Guard District, for publication in his "Local Notice to Mariners" and to the local press at Norfolk and Newport News, Va.

(c) The regulations in this section shall be enforced by the Commanding Officer, Fort Monroe, Va., and such agencies as he may designate.

§334.360 Chesapeake Bay off Fort Monroe, Va.; restricted area, U.S. Naval Base and Naval Surface Weapons Center. (a) The danger zone. Beginning at latitude 37°00′30″, longitude 76°18′05″; thence to latitude 37°00′38″, longitude 76°17′42″; thence to latitude 37°01′00″, longitude 76°17′15″; thence to latitude 37°01′00″, longitude 76°16′11″; thence to latitude 36°59′43″, longitude 76°16′11″; thence to latitude 36°59′18″, longitude 76°17′52″; thence to latitude 37°00′05″, longitude 76°18′17″; and thence north along the seawall to the point of beginning.

(b) The regulations. (1) Anchoring, trawling, fishing, and dragging are prohibited in the danger zone, and no object, either attached to a vessel or otherwise, shall be placed on or near the bottom.

(2) This section shall be enforced by the Commander, Naval Base, Norfolk, Virginia, and such agencies as he may designate.

§334.370 Chesapeake Bay, Lynnhaven Roads; danger zones, U.S. Naval Amphibious Base. (a) Underwater demolitions area (prohibited)–(1) The area. A portion of the restricted area for Navy amphibious training operations described in §207.157, along the south shore of Chesapeake Bay, bounded as follows: Beginning at a point on the mean low-water line at longitude 76°08′59″; thence 200 yards to latitude 36°55′36″, longitude 76°08′57″; thence 400 yards to latitude 36°55′34″, longitude 76°08′43″; thence 200 yards to a point on the mean low-water line at longitude 76°08′45″; and thence approximately 400 yards along the mean low-water line to the point of beginning. The area will be marked by range poles set on shore on the prolongation of the lines forming its eastern and western boundaries.

(2) The regulations. Vessels other than those owned and operated by the United States shall not enter the prohibited area at any time unless authorized to do so by the enforcing agency.

(b) Small-arms firing range–(1) The Area. Beginning at a point on the shore line at latitude 36°55′27″, longitude 76°08′38″; thence to latitude 36°55′50″, longitude 76°08′37″; thence to latitude 36°57′11″, longitude 76°08′11″; thence to latitude 36°56′53″, longitude 76°07′18″; thence to latitude 36°55′39″, longitude 76°07′46″; thence to latitude 36°55′22″, longitude 76°08′17″; thence along the shore line to the point of beginning.

(2) The regulations. (i) Passage of vessels through the area will not be prohibited at any time, nor will commercial fishermen be prohibited from working fish nets within the area. No loitering or anchoring for other purposes will be permitted.

(ii) A large red warning flag will be flown on shore during periods when firing is in progress. Observers will be on duty and firing will be suspended for the passage of vessels and for the placing and maintenance of fish nets within the area.

(c) This section shall be enforced by the Commanding Officer, U.S. Naval Amphibious Base, Little Creek, Norfolk, Virginia.

3. SANDY HOOK TO CAPE HENRY

Between New York Bay and Delaware Bay is the New Jersey coast with its many resorts, its inlets, and its Intracoastal Waterway. Delaware Bay is the approach to Wilmington, Chester, Philadelphia, Camden, and Trenton; below Wilmington is the Delaware River entrance to the Chesapeake and Delaware Canal, the deep inside link between Chesapeake and Delaware Bays. The Delaware-Maryland-Virginia coast has relatively few resorts; the numerous inlets are backed by a shallow inside passage that extends all the way from Delaware Bay to Chesapeake Bay. The last seven chapters, nearly half of this book, are required to describe Chesapeake Bay to Norfolk and Newport News, to Washington and Baltimore, and to Susquehanna River 170 miles north of the Virginia Capes.

A vessel approaching this coast from seaward will be made aware of its nearness by the number of vessels passing up and down in the coastal trade. The coast of New Jersey is studded with large hotels, prominent standpipes, and elevated tanks. South of Delaware Bay, the principal landmarks are the lighthouses and Coast Guard stations.

The general tendency along this mostly sandy coast is for the ocean beaches and the points on the north sides of the entrances to wash away and for the points on the south sides of the entrances to build out. Protective works have done much to stabilize the New Jersey coast, but several lighthouses have been abandoned between Delaware Bay and Chesapeake Bay because of erosion.

The shores of Delaware Bay and Delaware River are mostly low and have few conspicuous marks, other than lights, below the industrial centers along the river. The shores of Chesapeake Bay are low as far north as Patuxent River, then rise to considerable heights at the head of the bay.

Disposal Sites and **Dumping Grounds.**–These areas are rarely mentioned in the Coast Pilot, but are shown on the nautical charts. (See Disposal Sites and Dumping Grounds, chapter 1, and charts for limits.)

Aids to navigation.–Lights are numerous along the section of the coast covered by this Coast Pilot. Radiobeacons and fog signals are at most of the principal light stations. Marker radiobeacons, low-powered and for local use only, are at the entrances to many of the inlets. Many coastal and harbor buoys are equipped with radar reflectors, which greatly increase the range at which the buoys may be detected on the radarscope. The critical dangers are marked.

Loran.–Loran C stations provide the mariner with good navigation coverage along this section of the coast.

Radar, though always a valuable navigational aid, is generally of less assistance in navigation along this coast due to the relatively low relief; the accuracy of radar ranges to the beach cannot be relied upon. Coastal buoys equipped with radar reflectors are of help in this regard. It is sometimes possible to obtain a usable radar return from the larger lighthouses, but positive target identification is usually difficult. Radar is of particular importance in detecting other traffic and in the prevention of collisions during periods of inclement weather, and in fog and low visibility.

COLREGS Demarcation Lines.–Lines have been established to delineate those waters upon which mariners must comply with the International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) and those waters upon which mariners must comply with the Inland Navigational Rules Act of 1980 (Inland Rules). The waters inside of the lines are **Inland Rules Waters,** and the waters outside of the lines are **COLREGS Waters.** (See **Part 80,** chapter 2, for specific lines of demarcation.)

Ports and Waterways Safety.–(See **Part 160**, chapter 2, for regulations governing vessel operations and requirements for notification of arrivals, departures, hazardous conditions, and certain dangerous cargoes to the Captain of the Port.)

Harbor and Inlet Entrances.–The channels into Delaware and Chesapeake Bays are broad and deep. The entrances to the inlets are comparatively shallow and are more or less obstructed by shifting sandbars. Some of the inlets have been improved by dredging and by the construction of jetties. On many of the bars the buoys are moved from time to time to mark the shifting channels. The best time to enter most of the inlets is on a rising tide with a smooth sea. Strangers should not attempt to enter the inlets without assistance when the seas are breaking on the bars. The tidal currents have considerable velocity in all of the entrances, and their direction is affected by the force and direction of the wind.

Traffic Separation Schemes (Traffic Lanes) have been established at the entrances to New York Harbor, Delaware Bay and Chesapeake Bay, and in the main channel of Chesapeake Bay off Smith Point just south of the entrance to the Potomac River. (See chapters 4, 6, 9, and 12, respectively, for details.)

Anchorages.–The only protected anchorage for deep-draft vessels between New York Bay and Chesapeake Bay is outside the channel limits in Delaware Bay according to draft. Absecon Inlet, Cape May Inlet, and some of the others can accommodate light-draft vessels such as trawlers and small yachts, but not medium or deep drafts. Small local craft often seek shelter inside the shallower inlets, but entrance is difficult in heavy weather, and the unimproved inlets are often difficult even in good weather, particularly for strangers.

A number of anchorage areas have been established by Federal Regulations within the area of this Coast Pilot. (See **Part 110**, chapter 2, for limits and regulations.)

Dangers.–The principal dangers along this coast are the outlying sand shoals, the fogs, and the doubtful direction and velocity of the currents after heavy gales. Depths of 7½ fathoms are found as far as 20 miles from shore. There are many wrecks along this coast, but most of them have been blasted off or cleared to safe navigational depths; the others are marked by obstruction buoys.

Gales from northeast to southeast cause heavy breakers on the beaches and outlying shoals; the sea breaks in 4 to 5 fathoms of water, and shoals of that depth or less usually are marked during easterly gales. The bars across the inlets are then impassable and are defined by breakers even in comparatively smooth water with a light swell. The heaviest surf on the beach is on a rising tide near high-water springs; the least surf is encountered on a falling tide near low water. A very heavy surf makes on the beaches after a southeasterly gale followed by a sudden shift of wind to northwest.

Danger zones have been established within the area of this Coast Pilot. (See **Part 334,** chapter 2, for limits and regulations.)

Fishweirs are numerous along the outside coast and in Chesapeake Bay and tributaries. The stakes often become broken off and form a hazard to navigation, especially at

night. Regulations limiting the areas within which fishweirs may be established have been prescribed by the Chief of Engineers, U.S. Army. The areas within which fishweirs are permitted are shown on charts of 1: 80,000 scale and larger. The exact locations of the weirs within the designated areas are not shown.

Along the outer coasts the limits of fishweir areas are not marked. In Chesapeake Bay and tributaries, black and white horizontal-banded buoys mark the turns of the limits. Strangers should proceed with caution when crossing areas of possible fishweirs, and should avoid crossing such areas at night.

Pipelaying barges.–With the increased number of pipeline laying operations, operators of all types of vessels should be aware of the dangers of passing close aboard, close ahead, or close astern of a jetbarge or pipelaying barge. Pipelaying barges and jetbarges usually move at 0.5 knot or less and have anchors which extend out about 3,500 to 5,000 feet in all directions and which may be marked by lighted anchor buoys. The exposed pipeline behind the pipelaying barge and the area in the vicinity of anchors are hazardous to navigation and should be avoided. The pipeline and anchor cables also represent a submerged hazard to navigation. It is suggested, if safe navigation permits, for all types of vessels to pass well ahead of the pipelaying barge or well astern of the jetbarge. The pipelaying barge, jetbarge, and attending vessels may be contacted on VHF-FM channel 16 (156.80 MHz) for passage instructions.

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.

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.

The mariner should be acquainted with the general and specific regulations for drawbridges over waterways to be transited.

Routes.–Deep-draft vessels should stay outside of Barnegat Lighted Horn Buoy B and Five Fathom Bank Lighted Horn Buoy F between New York Harbor and Delaware Bay, and outside Delaware Lighted Horn Buoy D, Jack Spot Lighted Whistle Buoy 2JS (38°05.3'N., 74°45.1'W.), and Chesapeake Light between Delaware Bay and Chesapeake Bay. Traffic is heavy along this coast, and a sharp lookout must be kept to avoid collision. Vessels should approach Delaware Bay and Chesapeake Bay through the Traffic Separation Schemes that have been established off the entrances to these bays.

Inside Navigation.–Navigation on the waterways covered by this volume requires a knowledge of the channel conditions and other factors restricting navigation. General items of interest to the vessel operator are indicated in the paragraphs that follow; details are given in the text.

Federal regulations.–(See **207.100,** chapter 7, for the regulations governing the use, administration and navigation of the Chesapeake and Delaware Canal.)

Bends and curves.–The New Jersey Intracoastal Waterway and adjoining waterways have many sharp bends which are dangerous to vessels meeting or passing. On approaching a bend a vessel should reduce speed sufficiently to be able to stop within half the distance to a ship coming from the opposite direction. Under no circumstances should a vessel attempt to overtake and pass another at a bend. Even with sufficient view of the channel ahead and after proper exchange and understanding of signals, the overtaken vessel may suddenly sheer from current action. This is even more pronounced with larger vessels and tows.

Cross currents.–Where two streams cross, the current will have a greater velocity in the deeper channel. This is noticeable along the New Jersey Intracoastal Waterway where it follows a dredged canal cutting across a winding stream. Cross currents will also be noticed where either an inlet from the ocean or a drainage canal enter the waterway.

Cross currents are especially strong at Beach Haven Inlet, Absecon Inlet, Townsend Inlet, and Tuckerton Creek. Failure to allow for cross currents when passing these and other inlets has resulted in many rescue calls to the Coast Guard.

Stumps and sunken logs.–Reports are frequently made that vessels have struck shoals or rocks in rivers which have later proved to be stumps or sunken logs. Mariners are warned against navigating too close to the banks of streams where submerged stumps are known or may be expected to exist.

Hurricane moorings.–On receiving an advisory notice of a tropical disturbance, small boats should seek shelter in a small winding stream whose banks are lined with trees, preferably trees with deep roots. Moor with bow and stern lines fastened to the lower branches; if possible snug up with good chafing gear. The knees of the trees will act as fenders, and the branches, having more give than the trunks, will ease the shocks of the heavy gusts. If the banks are lined only with small trees or large shrubs, use clumps of them within each hawser loop. Keep clear of any tall pines or other shallow-rooted trees, since they generally are more apt to be blown down.

Tides.–The mean range of tide is 3.4 to 4.4 feet along the coast. In passages away from the inlets, the range may be as little as 0.5 foot. In Delaware River the mean range reaches 6.8 feet at Trenton, while in Chesapeake Bay the mean range is only 1.1 feet at Baltimore.

Currents.–Rotary currents and Gulf Stream currents could be discussed at considerable length, but the important currents are those in the inlets and the inside passages; the tidal currents have considerable velocity in all of the entrances, and their direction is affected by the force and direction of the wind.

Ice.–The intracoastal passages of New Jersey, Delaware, and Maryland usually are closed by ice during ordinary winters; the Virginia passages are closed only during severe winters and then only for short periods. Local vessels use all the inlets and adjacent channels from Sandy Hook to Cape Charles all winter, even when through navigation is blocked.

In Delaware River, ice is present in sufficient amounts even in ordinary winters to be of some concern. The Chesapeake and Delaware Canal is kept open as long as possible, but may be closed at times. In severe winters, navigation has been interrupted above Chester but tugs and large vessels keep the channels open to Philadelphia. Above Philadelphia, the river may be closed for extended periods in January and February, and navigation is practically suspended during severe winters.

Ice seldom interferes with navigation of full-powered vessels in Hampton Roads even in severe winters. Large vessels can always pass up and down Chesapeake Bay, but ice jams are of frequent occurrence off Baltimore Harbor. The harbor itself sometimes freezes over and navigation may

be blocked for small, low-powered vessels for limited periods.

Conditions in other Chesapeake Bay tributaries are somewhat similar to those in the same latitudes along the coast. Ice is not much of a problem in the southerly tributaries. The upper part of Potomac River is closed during severe winters, and Patuxent River is closed nearly to the mouth. Severn River, strangely enough, is said to remain open except for short periods in severe winters. Susquehanna River, at the head of the bay, usually is completely closed for about 3 months. Ice conditions in the Eastern Shore tributaries correspond roughly to those across the bay.

During some winter months or when threatened by icing conditions, lighted buoys may be removed from station or replaced by unlighted buoys; unlighted buoys, daybeacons, and lights on marine sites also may be removed. (See LIGHT LIST.)

For icing hazards to vessels see Superstructure icing, following.

Weather.–Weather hazards can plague navigation along this stretch of coast in all seasons, whether sailing the open Atlantic or the more sheltered inland waterway.

In this chapter, a brief seasonal overview of weather difficulties is followed by a summary of weather hazards and related problems. Detailed local weather problems are discussed in the appropriate chapters. Climatological summaries for coastal stations and marine areas can be found in the appendix.

The area covered in this Coast Pilot is generally low and flat. Long stretches of sandy beaches and tidewater marshes characterize the New Jersey, Delaware, and Maryland ocean coasts. The eastern shore of Chesapeake Bay consists of low, flat, almost featureless plains, with numerous irregularities and small islands. The western shore is a gently rolling upland. Tidewater Virginia encompasses numerous flat peninsulas, wide estuaries, and many swamps. Topography farther inland rises in an irregular pattern of progressively higher northeast-southwest mountain ranges to the main Appalachian Mountains. Although some distance from the ocean, this mountain barrier exerts an important influence on the winter climatic pattern in the coastal area; it partly blocks the cold continental air from the interior, and this combines with the moderating effect of the ocean to produce a more equable climate than is found in continental locations in the same latitude elsewhere.

Winter navigation is restricted by extratropical storms that ravage the mid-Atlantic coast. These low pressure systems, which develop over the interior Gulf of Mexico and off the southeastern coast, usually move northward through east-northeastward, sweeping through the mid-Atlantic coast often accompanied by strong gusty winds and rain or snow. Highs from the interior usually follow the passage of these lows producing a pattern of rapidly changing air masses and variable winter weather from about November through March. There are marked temperature fluctuations and alternating periods of brief stormy weather, clear crisp days, and relatively mild conditions. A combination of strong winds, rough seas, and cold temperatures, can result in superstructure icing, where sea spray and sometimes precipitation can freeze to a ship's superstructure. This adds tremendous weight and creates dangerous instability.

In spring a semipermanent fair weather system known as the Bermuda High, although still centered far to the southeast, begins to influence the southeast coast. The Middle Atlantic area is usually outside its circulation and is still subject to the passage of extratropical cyclones, frontal activity, and changing air masses. Warm rainy spells alternate with cool dry weather. Fog becomes a problem when warm air flows across still cold water.

By early summer, the Bermuda High has built northward and westward, embracing the entire eastern seaboard with its circulation. It is responsible for the warm humid southerly flow that prevails. When it persists, the Bermuda High can block low pressure systems from the continent, providing a week or two of typical summertime weather, warm temperatures, high humidity, light to moderate southerly and southwesterly winds, and showers and thunderstorms. When pressure gradients are weak an alternating land-sea breeze is common along the coast. Summer is also the start of the hurricane season.

The threat of tropical storms and hurricanes continues in autumn as the Bermuda High begins to shift southward and eastward and weaken. This leaves the coast under the influence of a weak continental high that gradually gives way to the winter weather pattern of increased frontal activity, winter storms, and migratory high pressure systems. While autumn brings a battle for control of the weather, these are mainly periods of dry sunny days and cool clear nights. During these periods there is the possibility of radiation type fog, forming inland at night and drifting out along the coast in the early morning. This fog is more localized than the spring advection fog and usually burns off before noon.

Climatological tables.–Climatological tables for coastal localities, and meteorological tables for the coastal ocean areas covered in this volume follow the appendix. The meteorological tables were compiled from observations made by ships in passage. Listed in the appendix are National Weather Service offices and radio stations which transmit weather information.

Storm warning display locations are listed on the NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service. The Marine Weather Services Charts, which contain additional important information, are available from National Ocean Service, Distribution Branch (N/CG33). (See appendix for address.)

Superstructure icing.–In certain weather conditions, ice accumulating on hulls and superstructures can be a serious danger to ships. Ice accumulation may occur from three causes:

(a) Fog with freezing conditions;

(b) Freezing rain or drizzle;

(c) Sea spray or seas breaking over the ship when the air temperature is below the freezing point of seawater (about 28.6°F).

Ice accumulation from the first two causes, if appreciable, could induce enough damage to the rigging to cause it to fall. This is minor, however, in comparison with the weight of the ice accumulated in rough weather and low temperatures, when large amounts of spray and often heavy seas break over a vessel. When the air temperature is below the freezing point of sea water and the ship is in heavy seas, considerable amounts of water will freeze to the superstructure and those parts of the hull which are sufficiently above the waterline to escape being frequently washed by the sea. The amounts frozen to surfaces exposed to the air will rapidly increase with falling air and sea temperatures, and might in extreme cases lead to capsizing of the vessel. The dangerous conditions are those in which gale-force winds last for several days in association with air temperatures of 28°F or lower. These conditions will normally occur when the wind comes from the northern quadrants. Indications of when these conditions are likely to occur can often be obtained by observing the rate of fall of the barometer, at

the onset of strengthening winds from a cold quarter, together with observations of air and sea temperatures.

Superstructure icing at its worst can sink a small vessel. It elevates the center of gravity, decreasing the metacentric height. Icing increases the sail area and the heeling moment due to wind action. Its non-uniform distribution changes the trim; it can hamper steerability and lower ship speed. Icing can also cause hazardous deck conditions.

Pressure.–The pressure pattern changes considerably from summer to winter. At individual stations along the coast, however, the differences of mean annual pressure are quite small. The highest monthly mean pressure occurs during the winter and the lowest in late spring and early summer. Large short-term variations of pressure are occasionally experienced during tropical cyclones in the late summer and autumn, and during the movement of extratropical cyclones and anticyclones in the winter and spring. The day-to-day changes of pressure in summer are less marked and average lower than in winter.

Winds.–Prevailing winds at most stations are from northwest during the cooler months, October through March, and from the southwest, May through September. The average wind speeds during the warmer months are generally lower than during the colder seasons, because of the absence of extratropical cyclones. Highest average speeds occur in March and lowest in August.

In the winter, the winds over the open ocean are slightly stronger than those over land. Little difference is apparent in summer. In the warmer season, a daily shift in wind direction occurs when the region is not under the influence of cyclonic storms. During the warmer part of the day winds blow onshore, and during the cooler part, offshore. This land-sea breeze seldom penetrates more than a few miles inland.

Gales (force 8 or higher) are reported in about 6 percent of ships' observations in winter. Gales are generally from the westerly quadrants. Summer gales are rare, but may be encountered during tropical cyclones or local thunderstorms.

Temperatures.–Along the Middle Atlantic Coast temperatures are generally moderate. Mean annual temperatures range from 53.5° F at Philadelphia to 59.7°F at Norfolk. The lowest mean monthly temperature is 32.3° F at Philadelphia in January; the highest, 78.8° F at Norfolk in July. January is the coldest month and July the warmest. Over the open water areas, January mean air temperatures may be several degrees warmer than at coastal points, and in July they may be a few degrees cooler. Over land surfaces, the air warms and cools readily, but over water it does so slowly and relatively little. Land surfaces absorb heat in only a thin surface layer and give it up freely, while water absorbs heat to substantial depths and retains it longer.

The daily temperature range averages from 10° to 20° F throughout the year, and is generally much less over the water. Readings in the coastal areas rarely exceed 100° F, and the 90° level is reached on only one-third to one-half of the days during summer. Freezing temperatures are probable on one-half or more of the days from November through March, except from Maryland southward where the average is about one in three. Below-zero readings have been recorded during December, January, and February at most stations, except Norfolk where no reading below 2° F has ever been observed.

Sea-surface temperatures are warmer than air temperatures most of the time, ranging from 4° to 7° F warmer in winter to about the same temperature in the spring.

Relative humidity.–Throughout the year the relative humidity is high, averaging from 64 to 90 percent at 0700 and from 46 to 62 percent at 1900. Humidities usually are higher with onshore winds (blowing from sea toward land) and lower with offshore winds (blowing from land toward sea).

Cargo care.–High humidities and temperature extremes can be encountered navigating the East Coast and 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.

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 on board 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 warm weather and moves into a cooler region, vulnerable cargo should be ventilated.

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 generality does not take into account the possibility of necessary venting for gases or fumes.

Cloudiness and precipitation.–At sea in winter, overcast conditions (cloud amount 0.8 or more) are recorded in 45 to 50 percent of observations, while clear conditions (0.2 or less) are recorded in about 30 percent. In summer, some 30 to 35 percent of observations show overcast and an equal percent, clear skies. The least cloudiness occurs when the air is dominated by the Bermuda High in late summer and early autumn, and the greatest cloudiness during the frequent winter cyclones. In the coastal area, from one-third to one-half the days are overcast in winter, and 25 to 35 percent in summer.

Precipitation over the coastal sections is moderately heavy and well distributed. Normal monthly totals vary from minima of about 2.5 to 3.0 inches in February or October to maxima of 4.5 to 6.0 inches in August. Annual totals range between 41 and 45 inches. Summer thunderstorms are most frequent over land and near coastal waters in the afternoon; at night they are more frequent over open water. Thunderstorm rainfall is less intense over the ocean, but can severely restrict visibility. Snow may be expected from November through March; maximum fall is in January and February. Snow usually does not remain on the ground for extended periods. On rare occasions, freezing rain, or glaze, is encountered; if prolonged, it can cause damage to rigging. Snow at sea is little more than a severe restriction to visibility.

Visibility.–Although generally good, visibility can be hampered by fog, precipitation, haze and smoke. Fog is usually the most restrictive. It is most likely over open waters in spring and early summer when warm moist air moves across still cool waters. Off the coast from March through June, this advection fog restricts visibility to less than 0.5 mile, 3 to 8 percent of the time. Visibilities fall below 2 miles, 5 to 12 percent of the time during this period. While advection fog sometimes drifts onshore, radiation fog in autumn and winter is more common just inland. Radiation fog forms on calm, clear nights and may drift

over water during the early morning hours. It usually burns off by noon. At coastal locations visibilities fall below 0.25 mile about 2 to 5 days per month from September through March; some locations suffer through June if they are exposed to sea fog. Smoke and haze by themselves rarely reduce visibilities below 2 miles but precipitation can briefly, particularly in heavy showers.

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; stirring a breeze or creating gusts to 100 knots. Thunderstorms can spring up rapidly or be tracked for several days; bring gentle showers or a torrential downpour. Thunderstorms can harbor a tornado or waterspout and produce vivid lightning displays. The number of thunderstorms can vary from year to year, but on the average they can be expected on 4 to 10 days per month from May through August.

Along the coast and over the bays, thunderstorms are most likely from midafternoon through the evening. These are the typical air mass thunderstorms that result from warm moist air being heated and forced to rise. Cold fronts can also generate thunderstorms and often squall lines, which can occur at any time. When thunderstorms coincide with the time of maximum daily heating, they are most violent. In spring and early summer, thunderstorms usually develop to the west and southwest and approach at 20 to 35 knots; they are often severe. As summer progresses air mass thunderstorms are more likely. These form to the west and east of Chesapeake Bay and move eastward at about 10 to 20 knots.

Tropical Cyclones.–Tropical storms and hurricanes are an infrequent but dangerous threat to navigation. At sea, winds can reach 175 knots or more and waves of 35 to 40 feet are likely; in an intense storm the waves may exceed 50 feet. On the coast, storm tides as much as 17 feet or more above mean sea level are possible as is rainfall of 15 inches or more. A tropical cyclone is a warm-core, low-pressure system that develops over the warm waters of the tropical oceans, and exhibits a rotary, counterclockwise circulation in the Northern Hemisphere (clockwise in the Southern Hemisphere). Tropical cyclones occur almost entirely in six rather distinct regions of the world; one of these, the **North Atlantic Region** (West Indies, Caribbean Sea, Gulf of Mexico, and waters off the east coast of the United States), includes the area covered by this Coast Pilot. In this region, tropical cyclones with winds of 34 to 63 knots are called **tropical storms,** while tropical cyclones with winds greater than 63 knots are called hurricanes. **Hurricanes** are infrequent in comparison with middle-and high-latitude storms, but they have a record of destruction far exceeding that of any other type of storm. Because of their fury, and the fact that they are predominately oceanic, they merit the special attention of all mariners, whether professional or amateur.

While tropical cyclones can occur at any time, they are most likely from June through early November. Along this section of the coast their greatest frequency occurs from mid-August through September. They are often in the process of recurving and tend to parallel the coastline. The most dangerous storms are those that move slowly northward and remain just off the coast. Fortunately, tropical cyclones tend to accelerate as they move into higher latitudes; forward speeds of 20 to 30 knots are not uncommon.

Rarely does the mariner who has experienced a fully developed tropical cyclone (hurricane) at sea wish to encounter a second one. He has learned the wisdom of avoiding them if possible. The uninitiated may be misled by the deceptively small size of a tropical cyclone as it appears on a weather map, and by the fine weather experienced only a few hundred miles from the reported center of such a storm. The rapidity with which the weather can deteriorate with approach of the storm, and the violence of the hurricane, are difficult to visualize if they have not been experienced.

As a tropical cyclone moves out of the Tropics to higher latitudes, it normally loses energy slowly, expanding in area until it gradually dissipates or acquires the characteristics of extratropical cyclones. At any stage, a tropical cyclone normally loses energy at a much faster rate if it moves over land. As a general rule, tropical cyclones of the North Atlantic Region move with the prevailing winds of the area. In small hurricanes the diameter of the area of destructive winds may not exceed 25 miles while in some of the greatest storms the diameter may be as much as 400 to 500 miles.

At the center is a comparative calm known as the "eye of the storm". The diameter of this "eye" varies with individual storms and may be as little as 7 miles, but is rarely more than 30 miles. The average is 15 to 20 miles. This center is the region of low atmospheric pressure around which winds blow in a more or less circular course, spiraling inward in a counterclockwise direction. Winds at the outer edge of the storm area are light to moderate and gusty, and often increase toward the center to speeds too high for instrument recording. Although the air movement near the center of the hurricane is usually light and fitful, the seas in this area are in most cases very heavy and confused, rendered so by the violent shifting winds which surround it. Furthermore, after the center has passed a vessel, she may expect a sharp renewal of the gales, with winds from a more or less opposite direction. The hurricane may effect an area covering tens of thousands of square miles.

In an average year over the entire North Atlantic (including the Caribbean Sea and the Gulf of Mexico) about nine or ten tropical cyclones come to life and about six of these reach hurricane strength. They usually form over a wide range of ocean between the Cape Verde Islands and the Windward Islands, over the western Caribbean Sea, and in the Gulf of Mexico. While some may initially move northward most take a westerly to northwesterly course. Of these, some curve gradually northward either east or north of the larger islands of the West Indies, then finally turn northeastward or eastward off the U.S. Atlantic coast.

A considerable number, however, remain in low latitudes and do not turn appreciably to the northward. Freak movements are not uncommon, and there have been storms that described loops, hairpin-curved paths, and other irregular patterns. Movement toward the southeast is rare, and in any case of short duration. The entire Caribbean area, the Gulf of Mexico, the coastal regions bordering these bodies of water, and the Atlantic Coast are subject to these storms during the hurricane season.

Hurricanes develop over the southern portions of the North Atlantic, including the Gulf of Mexico, and Caribbean Sea, **mostly from June through October, infrequently in May and November, and rarely in other months;** the hurricane season reaches its peak in September. An average of nine tropical cyclones form each year (reaching at least tropical storm intensity), and five of these reach hurricane strength. June and July storms tend to develop in the northwestern Caribbean or Gulf of Mexico; during August there is an increase in number and intensity, and the area of formation extends east of the Lesser Antilles. September storms develop between 50° W and the Lesser Antilles, in the southern Gulf of Mexico, the western Caribbean, near the Bahamas, and around the Cape Verde Islands. Formation in October shifts primarily to the western Caribbean,

and off-season storms are widespread with a slight concentration in the southwestern Caribbean.

The average speed of movement of tropical cyclones in the Tropics is about 10 to 15 knots. This speed, however, varies considerably according to the location of the storm, its development, and attendant meteorological conditions. The highest rates of progression usually occur when the storm is moving northward or northeastward in the middle or higher latitudes.

Extratropical cyclones.–These winter-type storms, while abundant all year, are most intense from fall through spring. Along this coast they are often known as "Nor'easters". They can generate hurricane-force winds and can vary in size from 100 miles to nearly 1,000 miles in diameter. Waves generated by these storms commonly exceed 40 feet and have been reported at more than 60 feet in the open ocean. Like tropical cyclones, they can devastate the shore, rearrange the coastal topography, and cause extensive flooding.

These storms generally move into this region from the west or southwest. Those from the Gulf of Mexico area are usually more intense because of their overwater route. They often intensify off Cape Hatteras before sweeping northeastward. Heavy rain or snow before the passage of the storm center may be extensive. After the center passes, northwesterly winds coming from the interior may be strong and cold. The classic "Nor'easter" is so called because winds over the coastal area are out of the northeast. They may occur at any time, but are most frequent and violent between September and April. They often develop off the mid-Atlantic coast and head northeastward toward New England.

Locating and tracking tropical cyclones.–By means of radio, the National Weather Service collects weather observations daily from land stations, ships at sea, and aircraft. When a tropical cyclone is located, usually in its early formative stage, it is followed closely. In the North Atlantic, U.S. Navy, Air Force, and NOAA aircraft make frequent flights to the vicinity of such storms to provide information needed for tracking the tropical cyclone and determining its intensity. Long-range shore radar stations follow the movement of the storm's precipitation area when it is in range. Bulletins are broadcast to ships several times daily, giving information on each storm's location, intensity, and movement. As a further aid, the mariner may obtain weather reports by radio directly from other ships in the vicinity of a tropical cyclone.

Signs of approach.–Although radio reports normally prove adequate for locating and avoiding a tropical cyclone, knowledge of the appearance of the sea and sky in the vicinity of such a storm is useful to the mariner. The passage of a hurricane at sea is an experience not soon to be forgotten.

An early indication of the approach of such a storm is the presence of a long swell. In the absence of a tropical cyclone, the crests of swell in the deep waters of the Atlantic pass at the rate of perhaps eight per minute. Swell generated by a tropical cyclone is about twice as long, the crests passing at the rate of perhaps four per minute. Swell may be observed several days before arrival of the storm.

When the storm center is 500 to 1,000 miles away, the barometer usually rises a little, and the skies are relatively clear. Cumulus clouds, if present at all, are few in number, and their vertical development appears suppressed. The barometer usually appears restless, pumping up and down a few hundredths of an inch.

As the tropical cyclone comes nearer, a cloud sequence begins which resembles that associated with the approach of a warm front in middle latitudes. Snow-white, fibrous "mare's tails" (cirrus) appear when the storm is about 300 to 600 miles away. Usually these seem to converge, more or less, in the direction from which the storm is approaching. This convergence is particularly apparent at about the time of sunrise and sunset.

Shortly after the cirrus appears, but sometimes before, the barometer starts a long, slow fall. At first the fall is so gradual that it only appears to alter somewhat the normal daily cycle (two maximums and two minimums in the Tropics). As the rate of fall increases, the daily pattern is completely lost in the more or less steady fall.

The cirrus becomes more confused and tangled, and then gradually gives way to a continuous veil of cirrostratus. Below this veil, altostratus forms, and then stratocumulus. These clouds gradually become more dense, and as they do so, the weather becomes unsettled. A fine, mistlike rain begins to fall, interrupted from time to time by showers. The barometer has fallen perhaps a tenth of an inch.

As the fall becomes more rapid, the wind increases in gustiness, and its speed becomes greater, reaching a value of perhaps 22 to 40 knots (Beaufort 6-8). On the horizon appears a dark wall of heavy cumulonimbus, the **bar** of the storm. Portions of this heavy cloud become detached from time to time and drift across the sky, accompanied by rain squalls and wind of increasing speed. Between squalls, the cirrostratus can be seen through breaks in the stratocumulus.

As the bar approaches, the barometer falls more rapidly and wind speed increases. The seas, which have been gradually mounting, become tempestuous and, squall lines, one after the other, sweep past in ever increasing number and intensity.

With the arrival of the bar, the day becomes very dark, squalls become virtually continuous, and the barometer falls precipitously, with a rapid increase in the wind speed. The center may still be 100 to 200 miles away in a hurricane. As the center of the storm comes closer, the ever-stronger wind shrieks through the rigging and about the superstructure of the vessel. As the center approaches, rain falls in torrents. The wind fury increases. The seas become mountainous. The tops of huge waves are blown off to mingle with the rain and fill the air with water. Objects at a short distance are not visible. Even the largest and most seaworthy vessels become virtually unmanageable, and may sustain heavy damage. Less sturdy vessels do not survive. Navigation virtually stops as safety of the vessel becomes the prime consideration. The awesome fury of this condition can only be experienced. Words are inadequate to describe it.

If the eye of the storm passes over the vessel, the winds suddenly drop to a breeze as the wall of the eye passes. The rain stops, and skies clear sufficiently to permit the sun to shine through holes in the comparatively thin cloud cover. Visibility improves. Mountainous seas approach from all sides, apparently in complete confusion. The barometer reaches its lowest point, which may be 1½ to 2 inches below normal in hurricanes. As the wall on the opposite side of the eye arrives, the full fury of the wind strikes as suddenly as it ceased, but from the opposite direction. The sequence of conditions that occurred during approach of the storm is reversed, and pass more quickly, as the various parts of the storm are not as wide in the rear of a storm as on its forward side.

Locating the center of a tropical cyclone.–If intelligent action is to be taken to avoid the full fury of a tropical cyclone, early determination of its location and direction of travel relative to the vessel is essential. The bulletins and forecasts are an excellent general guide, but they are not infallible and may be sufficiently in error to induce a mariner in a critical position to alter course so as to

unwittingly increase the danger of the vessel. Often it is possible, using only those observations made aboard ship, to obtain a sufficiently close approximation to enable the vessel to maneuver to the best advantage.

As previously stated, the presence of an exceptionally long swell is usually the first visible indication of the existence of a tropical cyclone. In deep water it approaches from the general direction of origin (the position of the storm center when the swell was generated). However, in shoaling water this is a less reliable indication because the direction is changed by refraction, the crests being more nearly parallel to the bottom contours.

When the cirrus clouds appear, their point of convergence provides an indication of the direction of the storm center. If the storm is to pass well to one side of the observer, the point of convergence shifts slowly in the direction of storm movement. If the storm center will pass near the observer, this point remains steady. When the bar becomes visible, it appears to rest upon the horizon for several hours. The darkest part of this cloud is in the direction of the storm center. If the storm is to pass to one side, the bar appears to drift slowly along the horizon. If the storm is heading directly toward the observer, the position of the bar remains fixed. Once within the area of the dense, low clouds, one should observe their direction of movement, which is almost exactly along the isobars, with the center of the storm being 90° from the direction of cloud movement (left of direction of movement in the Northern Hemisphere).

The winds are probably the best guide to the direction of the center of a tropical cyclone. The circulation is cyclonic, but because of the steep pressure gradient near the center, the winds there blow with greater violence and are more nearly circular than in extratropical cyclones.

According to Buys Ballot's law, an observer who faces into the wind has the center of the low pressure on his right (Northern Hemisphere) and somewhat behind him. If the wind followed circular isobars exactly, the center would be exactly eight points, or 90°, from dead ahead when facing into the wind. However, the track of the wind is usually inclined somewhat toward the center, so that the angle dead ahead varies between perhaps 8 and 12 points (90° to 135°). The inclination varies in different parts of the same storm. It is least in front of the storm, and greatest in the rear, since the actual wind is the vector sum of that due to the pressure gradient and the motion of the storm along the track. A good average is perhaps ten points in front, and 11 or 12 points in the rear. These values apply when the storm center is still several hundred miles away. Closer to the center, the wind blows more nearly along the isobars, the inclination being reduced by one or two points at the wall of the eye. Since wind direction usually shifts temporarily during a squall, its direction at this time should not be used for determining the position of the center.

When the center is within radar range, it might be located by this equipment. However, since the radar return is predominately from the rain, results can be deceptive, and other indications should not be neglected.

Distance from the storm center is more difficult to determine than direction. Radar is perhaps the best guide. The rate of fall of the barometer is of some help; this is only a rough indication, however, for the rate of fall may be quite erratic and will vary somewhat with the depth of the low at the center, the speed of the storm center along its track, and the stage in the life cycle of the storm.

Maneuvering to avoid the storm center.–The safest procedure with respect to tropical cyclones is to avoid them. With the aid of ship observations, satellite information and computers, there is ample warning time, usually 24 to 48 hours, to prepare for the approach of a tropical cyclone along this coast. These warnings are given wide distribution by commercial radio and television, Coast Guard and NOAA weather radio, and by visual displays whenever winds, weather, sea conditions or storm tides are expected to be a hazard to marine operations. If action is taken sufficiently early, this is simply a matter of setting a course that will take the vessel well to one side of the probable track of the storm, and then continuing to plot the position of the storm center, as given in the weather bulletins, revising the course as needed.

However, such action is not always possible. If one finds himself within the storm area, the proper action to take depends in part upon his position relative to the storm center and its direction of travel. It is customary to divide the circular area of the storm into two parts. In the Northern Hemisphere, that part to the **right** of the storm track (facing in the direction toward which the storm is moving) is called the **dangerous semicircle.** It is considered dangerous because (1) the actual wind **speed** is greater than that due to the pressure gradient alone, since it is augmented by the forward motion of the storm, and (2) the **direction** of the wind and sea is such as to carry a vessel into the path of the storm (in the forward part of the semicircle). The part to the **left** of the storm track is called the **navigable semicircle.** In this part, the wind is decreased by the forward motion of the storm, and the wind blows vessels away from the storm track (in the forward part). Because of the greater wind speed in the dangerous semicircle, the seas are higher here than in the navigable semicircle.

A plot of successive positions of the storm center should indicate the semicircle in which a vessel is located. However, if this is based upon weather bulletins, it is not a reliable guide because of the lag between the observations upon which the bulletin is based and the time of reception of the bulletin, with the ever present possibility of a change in the direction of motion of the storm. The use of radar eliminates this lag, but the return is not always a true indication of the center. Perhaps the most reliable guide is the wind. Within the cyclonic circulation, a **veering wind** (one changing direction to the right in the Northern Hemisphere and to the left in the Southern Hemisphere) indicates a position in the dangerous semicircle, and a **backing wind** (one changing in a direction opposite to a veering wind) indicates a position in the navigable semicircle. However, if a vessel is underway, its motion should be considered. If it is outrunning the storm or pulling rapidly toward one side (which is not difficult during the early stages of a storm, when its speed is low), the opposite effect occurs. This should usually be accompanied by a rise in atmospheric pressure, but if motion of the vessel is nearly along an isobar, this may not be a reliable indication. If in doubt, the safest action is usually to stop long enough to determine definitely the semicircle. The loss in valuable time may be more than offset by the minimizing of the possibility of taking the wrong action and increasing the danger to the vessel. If the wind direction remains steady (for a vessel which has stopped), with increasing speed and falling barometer, the vessel is in or near the path of the storm. If it remains steady with decreasing speed and rising barometer, the vessel is on the storm track, behind the center.

The first action to take if one finds himself within the cyclonic circulation, is to determine the position of his vessel with respect to the storm center. **While the vessel can still make considerable way through the water, a course should be selected to take it as far as possible from the center.** If the vessel can move faster than the storm, it is a relatively simple matter to outrun the storm if sea room permits. But

when the storm is faster, the solution is not as simple. In this case, the vessel, if ahead of the storm, will approach nearer to the center. The problem is to select a course that will produce the greatest possible minimum distance. This is best determined by means of a relative movement plot.

As a very general rule, for a vessel in the Northern Hemisphere, safety lies in placing the wind on the starboard bow in the dangerous semicircle and on the starboard quarter in the navigable semicircle. If on the storm track ahead of the storm, the wind should be put about two points on the starboard quarter until the vessel is well within the navigable semicircle, and the rule for that semicircle then followed. With a faster than average vessel, the wind can be brought a little farther aft in each case. However, as the speed of the storm increases along its track, the wind should be brought farther forward. If land interferes with what would otherwise be the best maneuver, the solution should be altered to fit the circumstances. If the speed of the vessel is greater than that of the storm, it is possible for the vessel, if behind the storm, to overtake it. In this case, the only action usually needed is to slow enough to let the storm pull ahead.

In all cases, one should be alert to changes in the direction of movement of the storm center, particularly in the area where the track normally curves toward the pole. If the storm maintains its direction and speed, the ship's course should be maintained as the wind shifts.

If it becomes necessary for a vessel to heave to, the characteristics of the vessel should be considered. A power vessel is concerned primarily with damage by direct action of the sea. A good general rule is to heave to with head to the sea in the dangerous semicircle or stern to the sea in the navigable semicircle. This will result in greatest amount of headway away from the storm center, and least amount of leeway toward it. If a vessel handles better with the sea astern or on the quarter, it may be placed in this position in the navigable semicircle or in the rear half of the dangerous semicircle, but never in the forward half of the dangerous semicircle. It has been reported that when the wind reaches hurricane speed and the seas become confused, some ships ride out the storm best if the engines are stopped, and the vessel is permitted to seek its own position. In this way, it is said, the ship rides with the storm instead of fighting against it.

In a sailing vessel, while attempting to avoid a storm center, one should steer courses as near as possible to those prescribed above for power vessels. However, if it becomes necessary for such a vessel to heave to, the wind is of greater concern than the sea. A good general rule always is to heave to on whichever tack permits the shifting wind to draw aft. In the Northern Hemisphere this is the starboard tack in the dangerous semicircle and the port tack in the navigable semicircle.

Practical rules.–When there are indications of a hurricane, vessels should remain in port or seek one if possible. Changes in barometer and wind should be carefully observed and recorded, and every precaution should be taken to avert damage by striking light spars, strengthening moorings, and if a steamer, preparing steam to assist the moorings. In the ports of the southern States hurricanes are generally accompanied by very high tides, and vessels may be endangered by overriding the wharf where moored if the position is at all exposed.

Vessels in the Straits of Florida may not have sea room to maneuver so as to avoid the storm track, and should try to make a harbor, or to stand out of the straits to obtain sea room. Vessels unable to reach a port and having sea room to maneuver usually observe the previously discussed general rules for avoiding the storm center, which, for power-driven vessels, are summarized as follows:

Right or dangerous semicircle.–Bring the wind on the starboard bow (045° relative), hold course, and make as much way as possible. If obliged to heave to, do so with head to the sea.

Left or navigable semicircle.–Bring the wind on the starboard quarter (135° relative), hold course, and make as much way as possible. If obliged to heave to, do so with stern to the sea.

On storm track, ahead of center.–Bring the wind two points on the starboard quarter (157½° relative), hold course, and make as much way as possible. When well within the navigable semicircle, maneuver as indicated above.

On storm track, behind center.–Avoid the center by the best practicable course, keeping in mind the tendency of tropical cyclones to curve northward and eastward.

Coastal effects.–Along the coast, water may inflict greater damage than wind. The storm tide is the result of the tropical cyclone's pressure and wind on the normal astronomical tide. When these forces occur simultaneously with a normal high tide the resultant flooding can be devastating. Add to that the unusually high seas generated by the storm and there is the potential for a disaster. Aids to navigation may be blown out of position or destroyed. Craft in harbors, unless properly secured, may drag anchor and/or be blown against obstructions.

When proceeding along a shore recently visited by a hurricane, a navigator should remember that time is required to restore aids to navigation which have been blown out of position or destroyed. In some instances the aid may remain, but its light, sound apparatus, or radiobeacon may be inoperative. Landmarks may have been damaged or destroyed.

Dangerous waves along the Gulf Stream.–Winter and spring storms passing over the Gulf Stream along the east coast of the United States may be modified rapidly enough to create dangerous wind and wave situations. This is particularly true in the North Wall, a narrow band of extreme horizontal water temperature change that marks the northern edge of the Gulf Stream. In early winter, cold air outbreaks along this northern edge sometimes result in a doubling of the wind speed of surrounding seas. During February and March the waters north of the Gulf Stream are at their coldest while the Gulf Stream remains relatively warm. Also, from the North Wall to 10 to 20 miles into the Gulf Stream, strong northeasterly currents are encountered. The strong northeasterly winds of intense coastal storms tend to pull cold Arctic air across the slope water to near Cape Hatteras. As this cold air reaches the Gulf Stream it encounters rapidly increasing sea surface temperatures. This sudden warming produces an increase in wind speeds and gustiness. In turn, this causes higher and confused seas. In addition, these northeasterly seas encounter opposing currents of 3 to 5 knots resulting in a sharp increase in wave heights and much steeper wave slopes. Waves may even break. This action causes problems for small craft navigating inlets in waves of only a few feet in height. With 20- to 30-foot seas the result is dangerous to any ship. To avoid this problem it is often best in late winter and spring to cross the Gulf Stream as far east as possible, since the cold air should be modified somewhat, reducing the instability effect.

Principal ports.–The ports within the area of this Coast Pilot which have deep-draft commercial traffic are Delaware City, Del.; Wilmington, Del.; Marcus Hook, Pa.;

Chester, Pa.; Philadelphia, Pa.; Gloucester City, N.J.; Camden, N.J.; Trenton, N.J.; Norfolk, Va.; Portsmouth, Va.; Newport News, Va.; Richmond, Va.; Piney Point, Md.; Alexandria, Va.; Cove Point, Md.; Cambridge, Md.; and Baltimore, Md.

Pilotage is compulsory for all foreign vessels and U.S. vessels under register in the foreign trade. Pilotage is optional for coastwise vessels that have on board a pilot properly licensed by the Federal Government for the waters which the vessel travels.

Maryland State pilots cruise in the pilot cruising area off Cape Henry; Virginia State pilots maintain a pilot station at Cape Henry; pilots for Delaware Bay and River maintain a pilot station at Cape Henlopen; Maryland State pilots and pilots for Delaware Bay and River also maintain a joint pilot station at Chesapeake City, Md., on the Chesapeake and Delaware Canal.

The Chesapeake and Interstate Pilots Association offers pilotage to U.S. vessels engaged in the coastwise trade. Pilotage is also available to public vessels. The association serves vessels transiting Chesapeake Bay and its tributaries, Chesapeake and Delaware Canal, Delaware Bay and River, and various ports along the upper Atlantic Coast. Chesapeake and Interstate Pilots Association has an office in Norfolk (telephone, 804-855-2733; cable, CINPILOT).

The Interport Pilots Agency, Inc. offers Pilotage to public and U.S. vessels in the coastwise trade transiting to Baltimore, the Chesapeake and Delaware Canal, Philadelphia, New York, Long Island Sound, Cape Cod Canal, and ports in the northeast. Arrangements for any of the above services are made in advance through the ships' agents or with their office in Atlantic Highlands, N.J. (telephone 201-291-1310; cable, PORTPILOTS). An updated 12-hour estimated time of arrival (ETA) is requested.

All pilot associations provide 24-hour service. Arrangements for pilots should be made well in advance through ships' agents.

Detailed information on pilotage procedures is given in the text for the ports concerned.

Towage.–Tugs are available at all 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 ships' agents or the pilots. (See the text for the ports concerned as to the availability of tugs.)

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.

Harbormasters, if available, are mentioned in the text. They generally have charge of the anchorage and berthing of vessels.

Supplies.–Water, marine supplies, other supplies and services, and all grades of heavy bunker oil, lubricants, and diesel oil are available to large vessels at Hampton Roads ports, Baltimore, and other major ports along the Delaware Bay and River.

Gasoline, diesel fuel, water, and marine supplies and services can also be obtained at most of the smaller ports.

Repairs.–Large oceangoing vessels can be drydocked and have major repair work done at Philadelphia, Chester, Baltimore, Newport News, Norfolk, and Portsmouth. Repair facilities for smaller vessels are also available at many places in the area covered by this Coast Pilot. (See text.)

Wrecking and salvage equipment is available at Philadelphia, Baltimore, and Norfolk.

Small-craft facilities.–Marine supplies, repair facilities, and other services for small craft are available at all the major ports, at numerous places on the New Jersey Intracoastal Waterway, and on many of the tributaries of the Chesapeake and Delaware Bays. For isolated places and small cities, the Coast Pilot describes the more important of these facilities; for large port areas, where individual facilities are too numerous to mention, the information given is more general. Additional information may be obtained from the series of small-craft charts published for the many places, and from various local small-craft guides.

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. (Navigation Rules, International-Inland Rule 9(b).)

Standard time.– The area covered by this Coast Pilot uses eastern standard time (e.s.t.), which is 5 hours slow of Greenwich mean time (G.m.t.). Example: When it is 1000 at Greenwich it is 0500 at Philadelphia, Pa.

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.

Legal public holidays.–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.

In the areas covered by this Coast Pilot, other holidays are observed: Martin Luther King Jr. Day, January 15, in Maryland; Lee-Jackson Day, third Monday in January, in Virginia; Presidential Inauguration Day, January 20, every fourth year in the District of Columbia; Lincoln's Birthday, February 12, in all States except Virginia; Good Friday, in Delaware, New Jersey, Pennsylvania, and Maryland; Maryland Day, March 25, in Maryland; Confederate Memorial Day, last Monday in May, in Virginia; Memorial Day, May 30, in Maryland; Flag Day, June 14, in Pennsylvania; Columbus Day, October 12, in Maryland; Defender's Day, September 12, in Maryland; General Election Day, first Tuesday after the first Monday in November, except in the District of Columbia.

4. NEW JERSEY COAST

This chapter describes the coast of New Jersey from Sandy Hook to Cape May Point, and the various inlets which make into it from the Atlantic Ocean. Also discussed are the resort towns of Atlantic City, Ocean City, and Cape May.

Charts 12326, 12323, 12318, 12304, 12214.–The coast of New Jersey extends in a general southerly direction for 44 miles from Sandy Hook to Barnegat Inlet, then southwesterly for 66 miles to Cape May Point. From Sandy Hook to Atlantic City the 60-foot curve is 5 to 10 miles from shore; off Delaware Bay the distance has increased to 17 miles.

Deep-draft vessels should stand off the coast in depths of 60 feet or more between New York Bay and Delaware Bay. Light-draft vessels can follow the shore more closely if they pay strict attention to the charts for fishweir areas, shoals, wrecks, and other obstructions. Small craft should wait for favorable weather before attempting an outside run along this coast.

The principal shallow-draft entrances are Shark River Inlet, Manasquan Inlet, Barnegat Inlet, Absecon Inlet, and Cape May Inlet. There are several others that are unimproved. The inlets are, or may be, obstructed by shifting bars, and most require local knowledge to carry the best water. The best time to enter is on a rising tide with a smooth sea; passage is hazardous during easterly gales and heavy seas.

In most cases the aids marking the various inlets are not charted due to the changing conditions.

The greater part of the New Jersey coast is summer-resort area, and the numerous standpipes and elevated tanks are prominent from seaward. The New Jersey Intracoastal Waterway, an inside passage from Manasquan Inlet to Delaware Bay, is described in chapter 5.

COLREGS Demarcation Lines.–The lines established for New York Harbor and the inlets of the New Jersey coast are described **80.165, 80.170, and 80.501**, chapter 2.

Weather.–Strong winds are most often a problem from November through March. Gales (winds of 34 knots or more) are encountered 3 to 5 percent of the time in these waters; they blow most frequently out of the northwest although northerlies and northeasterlies can also create problems. They are slightly more frequent in the stretch of ocean between Atlantic City and Cape May. In open waters, on the average, extreme winds can be expected to reach 70 to 75 knots compared to 60 to 70 knots in the inland waterway. Summer gales are rare but may be encountered in a thunderstorm or infrequent tropical cyclone. Along the coast strong winds (28 to 40 knots) blow 10 percent of the time in winter compared to less than 1 percent in summer.

Seas are roughest from September to March. In January waves of 8 feet or more are encountered about 15 to 25 percent of the time in deep waters. Rough seas are most likely with west and northwest winds of 20 knots or more and have reached 40 feet. While fog, haze, precipitation and smoke can hamper visibility, it is most restricted by advection fog. This occurs most often in late spring and early summer when warm south to southwest winds blow across the cold Labrador Current. May is usually the worst month, when visibilities less than 0.5 mile are encountered 4 to 9 percent of the time and less than 2 miles 5 to 15 percent of the time; highest frequencies occur nearest the New York Bight. Along the coast, visibilities less than 0.25 mile occur on 3 to 6 days per month from October through March. This is a combination of radiation fog, precipitation and smoke.

Traffic Separation Scheme Off New York has been established in the approaches to New York Harbor from sea. (See charts 12300, 12326, and Traffic Separation Schemes, chapter 1, for additional information.) (See also **167.1 through 167.155**, chapter 2, for limits and regulations.)

Caution.–Numerous fishing floats have been reported in the approach to New York Harbor in the Traffic Separation Scheme precautionary area.

Shipping safety fairways have been established connecting the eastern approach off Ambrose of Traffic Separation Scheme Off New York and the eastern approach off Nantucket of Traffic Separation Scheme Off New York. (See **166.100 through 166.500**, chapter 2, for limits and regulations.)

The fairways will show on charts 12300 and 13006. Current editions of these charts do not show the fairways. Their location was published in Defense Mapping Agency Notices to Mariners Nos. 42/87 and 48/87.

Chart 12326.–Low **Sandy Hook** on the south side of the entrance to **New York Harbor,** is the most northerly part of the New Jersey coast. **Sandy Hook Light** (40°27.7′N., 74°00.1′W.), 88 feet above the water, is shown from an 85-foot stone tower 1.2 miles from the north end of the point. The light, established in 1764, is the oldest in continuous use in the United States.

Sandy Hook Coast Guard Station, a standpipe, several towers, and two marine lights are prominent on the northern part of the hook. (See page T–1 for **New York City** and page T–2 for **Newark climatological tables.)**

Storm warning signals are displayed. (See chart.)

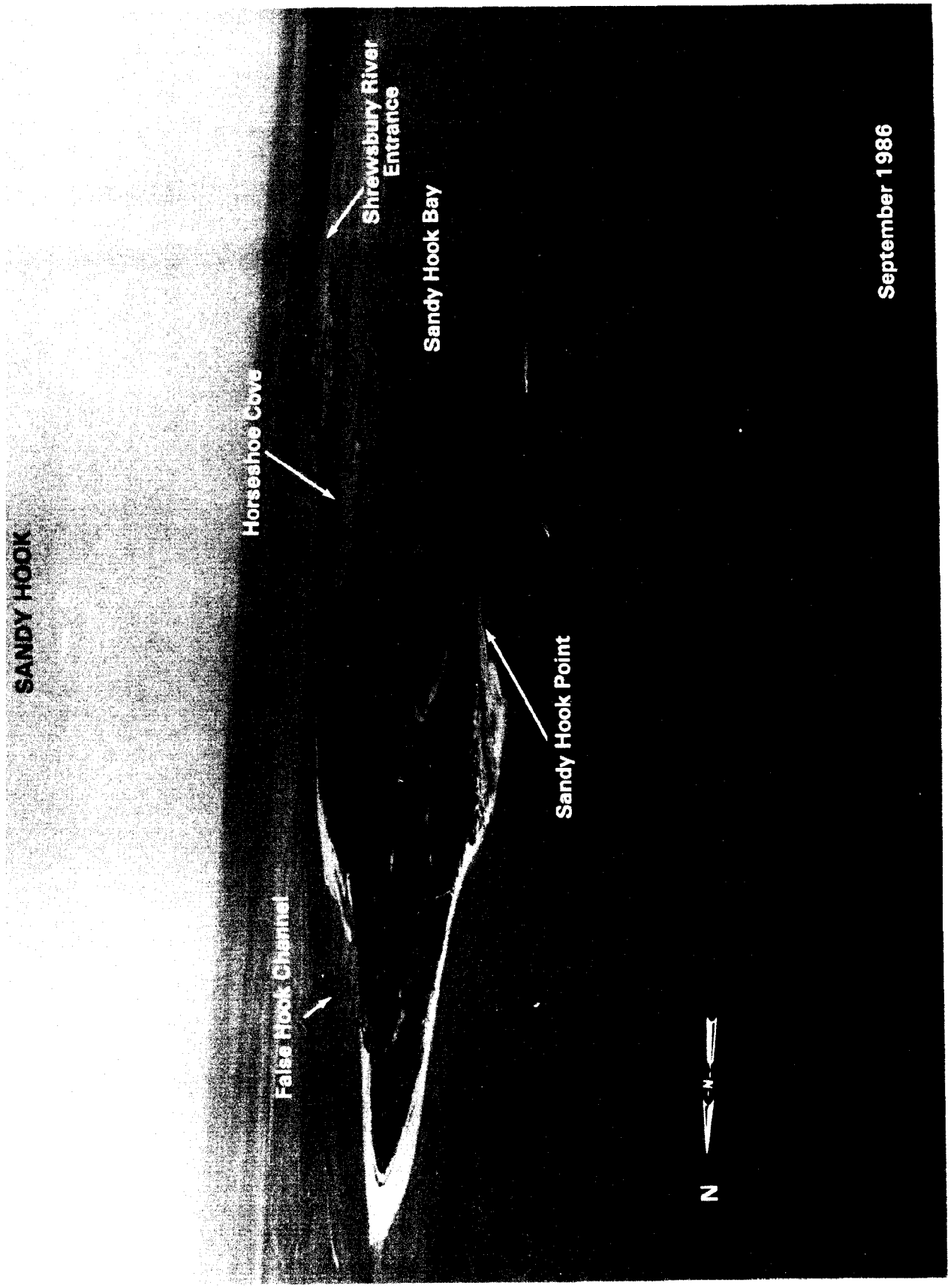
Sandy Hook is a Government reservation, and landing is prohibited as far south, approximately, as the bridge over the mouth of Shrewsbury River. Vessels awaiting favorable weather for an outside run can anchor in Sandy Hook Bay south of a line bearing due west from Sandy Hook Light. (See also chart 12330.)

Sandy Hook Bay, Navesink River, and **Shrewsbury River** are described in United States Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook.

On the northwest side of the approach to Navesink River is the highest ground along the open Atlantic Coast between Maine and Florida. The 276-foot wooded ridge is 4 miles south of Sandy Hook Light and 0.5 mile back of the outer beach. Abandoned **Navesink Lighthouse** (40°23.8′N., 73°59.2′W.), is in a cleared space on the easternmost spur at a ground elevation of 180 feet; the two 73-foot brownstone towers, the north one octagonal and the south square, are connected by a dwelling. A privately maintained light, 246 feet above the water, is now shown seasonally from the north tower.

Shrewsbury Rocks, 7.3 miles south of Sandy Hook Light, are 0.4 to a mile offshore and have a least depth of 14 feet; buoys are eastward of the rocks.

Chart 12324.–Shark River, which enters Shark Inlet 17 miles south of Sandy Hook Light, is the only small-craft harbor between Sandy Hook and Manasquan Inlet. The


SANDY HOOK
Horseshoe Cove
Shrewsbury River Entrance
Sandy Hook Bay
September 1986
Sandy Hook Point
False Hook Channel
N

town of **Avon** fronts the ocean on the north side of the river, and **Belmar** is on the south side.

Shark River Inlet is protected by jetties, each marked by a light near its outer end; a fog signal is at the north jetty light. **Shark River Coast Guard Station** is on the north side of the river, about 0.3 mile above the jetties. **Storm warning signals are displayed.** (See chart.)

A dredged channel leads through the inlet and river to the Belmar Municipal Boat Basin 1.2 miles above the jetties. In February 1981, the controlling depth was 7 feet (17 feet at midchannel) in the jetty channel to the Ocean Avenue Bridge, thence in 1981-April 1983, 7 feet (8 feet at midchannel) to Belmar Municipal Boat Basin. An anchorage is just east of State Route 71 highway bridge; in April 1983, 12 feet was available in the anchorage except for shoaling to 4½ feet along its north edge. The State of New Jersey maintains and marks several channels through the flats north and west of the boat basin; controlling depths were about 3 feet in 1967.

The mean range of tide is 4.0 feet in Shark River Inlet. In stormy weather, breakers form along the bar off the inlet, but entrance can be made in moderately rough weather with some local knowledge. When the winds and the tides are opposed, the inlet is difficult to enter. A cross current, strongest on the ebb, may be encountered at Ocean Avenue Bridge at the inner end of the jetties. Vessels for which the closed bridge clearance is insufficient should not attempt entrance until the drawspan is completely open.

Four bascule drawbridges cross the main or south channel of Shark River. Ocean Avenue Bridge, just inside the jetties, has a clearance of 15 feet; State Route 71 highway bridge, about 0.8 mile above the jetties, has a clearance of 13 feet; and about 0.9 mile above the jetties, the railroad bridge, and State Route 35 highway bridge immediately to the westward, have clearances of 10 feet. (See **117.1 through 117.59 and 117.751,** chapter 2, for drawbridge regulations.) The bridgetenders for the Ocean Avenue, the railroad, and State Route 35 bridges monitor VHF-FM channel 13; call signs, KMD-281, KT-4202, KXR-952, respectively.

The fixed spans of State Route 71 and State Route 35 highway bridges, and of the New York and Long Branch Railroad Company Bridge, cross the upper reach or north channel of Shark River at about the same distances above the jetties as the bascule spans of these bridges; least clearances are 20 feet horizontal and 8 feet vertical.

Overhead power cables cross the north channel of Shark River close eastward of the New York and Long Branch Railroad Company Bridge and close westward of State Route 35 highway bridge; least clearance is 32 feet.

There are excellent small-craft and fishing-boat facilities in Shark River inside the inlet. Most of these facilities are on both sides and above the inner bridges, and in the Belmar Municipal Boat basin. (See the small-craft facilities tabulation on chart 12324 for supplies and services available.)

Chart 12323.–The **danger zone** of a military firing range extends 2.2 miles seaward from the beach at the town of **Sea Girt,** about 20 miles south of Sandy Hook Light, and is marked by privately maintained buoys. (See **334.90,** chapter 2, for limits and regulations.)

Chart 12324.–Manasquan Inlet, 22 miles southward of Sandy Hook Light, is the Atlantic entrance to Manasquan River and the northern terminus of the New Jersey Intracoastal Waterway, which are described in chapter 5. **Manasquan Inlet Coast Guard Station** is on the south side of the inlet; the jettied entrance is well marked. In January 1986, the midchannel controlling depths were 9½ feet from the ocean to within 100 yards east of the ConRail bascule bridge, about 0.9 mile above the jetties.

Traffic conditions in Manasquan Inlet can be hazardous due to the large volume of commercial and pleasure boat traffic. Mariners are advised to exercise caution and control speed and wake while transiting the inlet. The Coast Guard monitors traffic in the inlet and safe boating is enforced.

Mariners should exercise caution when entering Manasquan Inlet when the winds and tides are opposed; local knowledge is advised.

Storm warning signals are displayed. (See chart.)

Charts 12323, 12324.–Bay Head, 2 miles south of Manasquan Inlet, is marked by a prominent elevated water tank. From Bay Head south, the resorts are more widely spaced on the low, narrow barrier beach which separates the inside waters from the ocean.

Barnegat Inlet, 21 miles southward of Manasquan Inlet, forms a passage from the Atlantic Ocean through **Oyster Creek Channel** to the New Jersey Intracoastal Waterway and Barnegat Bay. The inlet is protected by two partly submerged jetties; the north jetty is marked by a light at its outer end and the south jetty is marked by a buoy near the outer end. A fog signal is at the north jetty light, and a radiobeacon is at the **Barnegat Coast Guard Station** inshore of the south jetty. In December 1987, a new south jetty was under construction parallel to and about 300 yards southwestward of the north jetty. Abandoned Barnegat Lighthouse, on the south side of the inlet, is the most prominent landmark in the area; it is a 161-foot-high brick tower, dark red on its upper half and white on its lower half. The tower, no longer lighted, is maintained by the State of New Jersey as a historical monument. Also prominent from seaward is a 391-foot-high powerplant stack at the head of Oyster Creek, on the west side of Barnegat Bay.

Barnegat Inlet Channel and Oyster Creek Channel are subject to continual change due to severe shoaling. The buoys marking these channels are shifted frequently to mark the best water and therefore are not charted. In April 1981, it was reported that various aids marking the channels may be submerged because of strong tidal currents. Breakers make across the inlet with an ebb tide and an easterly wind. Strangers should not attempt to transit the inlet under any but ideal conditions. Boatmen needing assistance should lay outside the inlet and contact the local Coast Guard station.

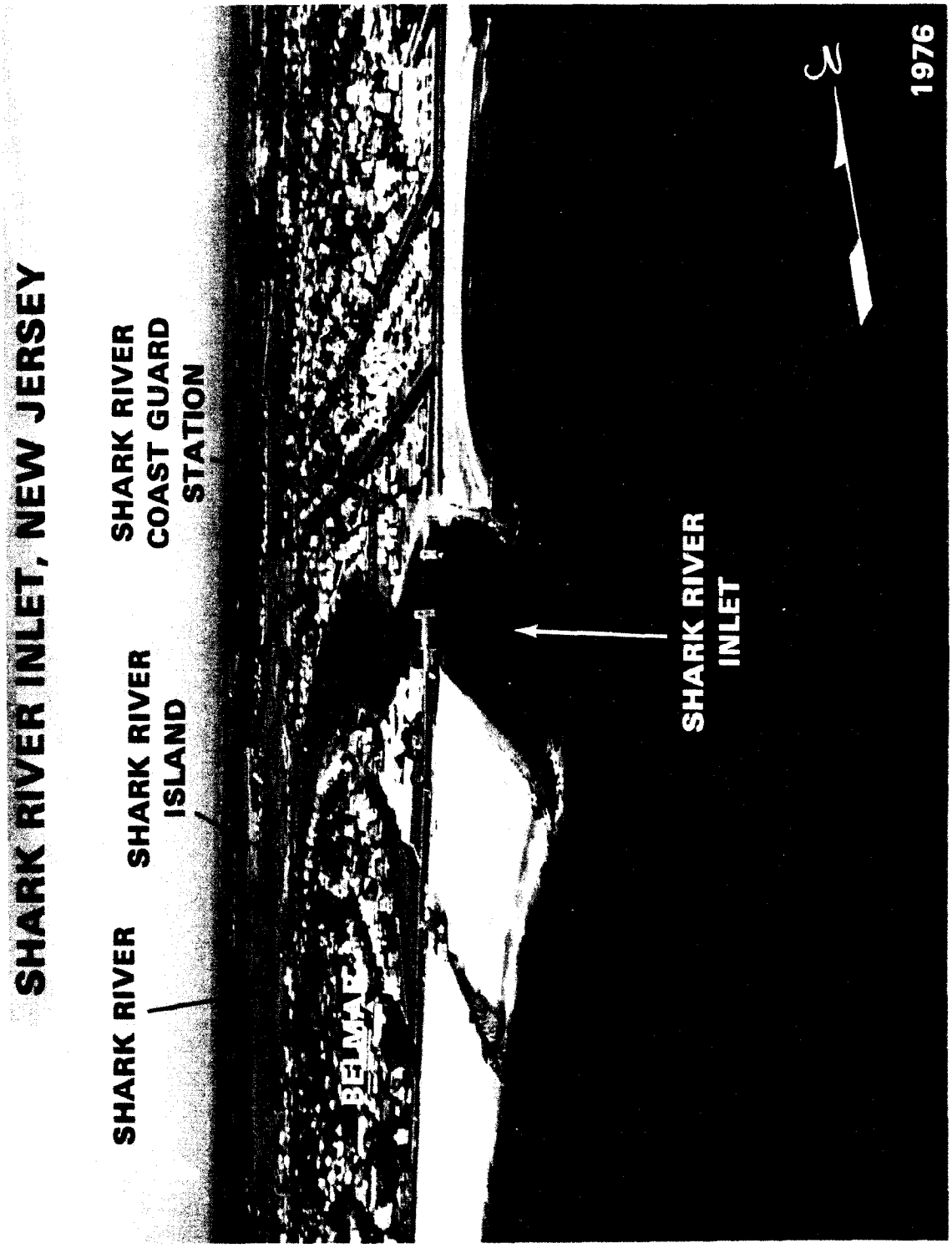
In 1980, a wreck reported visible in 1978, about 200 yards west of the north jetty light, in about 39°45.6′N., 74°05.6′W., was not visible.

The mean range of tide is 3.1 feet in Barnegat Inlet and 0.6 feet in Oyster Creek Channel. The current velocity is about 2.5 knots in the inlet, although currents as high as 7 knots have been reported.

Barnegat Light is a resort town on the south side of Barnegat Inlet. The channel to the small-craft and fishing-boat facilities on the bay side of the town is marked by privately maintained seasonal buoys or markers; these aids are not charted. (See the small-craft facilities tabulation on chart 12324 for services and supplies available.)

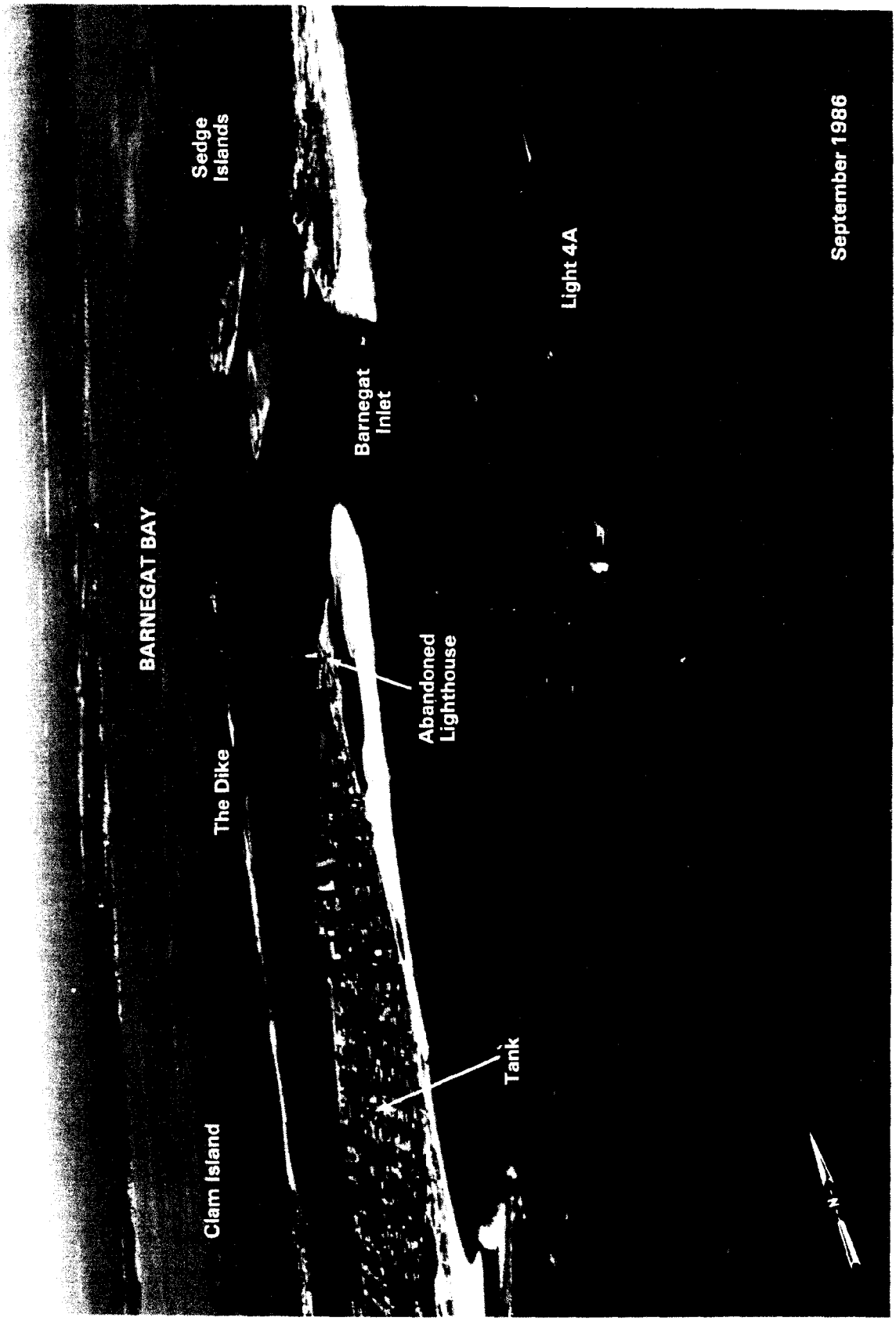
Charts 12323, 12316.–Beach Haven Inlet (39°30.0′N., 74°15.1′W.), 17 miles south-southwestward of Barnegat Inlet, is unmarked. Numerous wrecks and shoal spots are at the entrance. Due to changing conditions of the channel, boatmen are advised to seek local knowledge prior to entering. The mean range of tide is 3.7 feet.

The entrance to Beach Haven Inlet should not be mistaken for Little Egg Inlet, which is close southward.


SHARK RIVER INLET, NEW JERSEY
SHARK RIVER
SHARK RIVER ISLAND
SHARK RIVER COAST GUARD STATION
SHARK RIVER INLET
1976

MANASQUAN INLET
Watson Creek
Manasquan
Crabtown Creek
Manasquan River
Lake Louise
Manasquan Inlet
Coast Guard Station
September 1986

BARNEGAT INLET



Beach Haven Coast Guard Station is inside the barrier beach, 3.2 miles north of Beach Haven Inlet.

Charts 12318, 12316.–Little Egg Inlet (39°29.0′N., 74°17.5′W.), 19 miles south-southwestward of Barnegat Inlet and close southward of Beach Haven Inlet, is used considerably by local pleasure and fishing boats. Depth over the bar is ample for any vessel that can navigate the inside waters, but in very heavy weather breakers form all the way across the bar. The inlet channels and shoreline are constantly changing; the entrance is well marked, but the buoys are not charted because they are frequently shifted in position.

Brigantine Inlet, 2.6 miles south-southwestward of Little Egg Inlet, has shoaled to such an extent that it is unsafe for even the shallowest drafts. **Brigantine Shoal,** 3 miles south of the inlet, has a least depth of 17 feet and is marked by a buoy.

Absecon Inlet, 8.7 miles southwestward of Little Egg Inlet, is on the northeast side of **Atlantic City,** the largest resort on the New Jersey coast. The inlet is protected at the entrance by jetties; a revetment extends along the Atlantic City side of the inlet. Small-craft facilities are available at a hotel marina on the southwest side of the inlet.

Atlantic City Light (39°21.9′N., 74°24.6′W.), 43 feet above the water, is shown from a skeleton tower on the south side of Absecon Inlet; a radiobeacon is at the light. A light is on the outer end of the south jetty.

The channel through the inlet is well marked to the entrance to **Clam Creek** and to a junction with the New Jersey Intracoastal Waterway, 1 mile and 1.9 miles, respectively, above the south jetty light. The New Jersey Intracoastal Waterway is described in chapter 5. In May 1985, the controlling depth in Absecon Inlet was 13 feet to Clam Creek; thence in March 1986, 4 feet (5½ feet at midchannel) in Clam Creek entrance channel with 6 to 10 feet in the basin. The mean range of tide is 4.1 feet on the ocean side and about 3.5 feet inside the inlet. Current velocities up to 6 knots have been reported in the channel.

Weather.–The climate of Atlantic City is principally continental in character; however, the moderating influence of the Atlantic Ocean is apparent throughout the year. As a result, the summers are relatively cooler and winters milder than elsewhere at the same latitude. Land and sea breezes often prevail. Temperatures of 90° or higher are recorded about three times per year, which are considerably less than locations further inland. The weather tends to remain comparatively mild late into the fall, but on the other hand, warming is retarded in the spring. February is the coldest month and July the warmest. Precipitation, on the average, is moderate and well distributed throughout the year, with June the driest month and August the wettest. Thunderstorms are mostly a warm season phenomena. The bulk of winter precipitation results from storms which move northeasterly along or close to the coast. Snowfall, at about 15 inches per year, is considerably less than elsewhere at the same latitude, and does not remain long on the ground. Ice storms are relatively infrequent. (See page T–3 for **Atlantic City climatological table.**)

Atlantic City, on the south side of Absecon Inlet, is a base for a large fleet of fishing vessels and pleasure craft. The city has highway, rail, and air connections with the mainland; highways lead to the coastal towns northward and southward.

Starns Dock, 0.9 mile inside Absecon Inlet on the Atlantic City side, is in poor condition; gasoline, diesel fuel, and some marine supplies are available. **Atlantic City Coast Guard Station** is on the north side of the entrance to Clam Creek.

Clam Creek, on the south side of Absecon Inlet, has its entrance 1 mile northwestward of the south jetty light. The creek includes **Gardner Basin, Snug Harbor,** and **Delta Basin** on its southerly side, and the small-boat basin of the State marina on its northerly side. The municipal wharf is on the east side of the entrance to the small-boat basin.

Gasoline, diesel fuel, water, ice, and marine supplies can be obtained at the several small-craft facilities in the creek and in the small-boat basin. Hull and engine repairs can be made at the facilities in Gardner Basin and Snug Harbor; maximum haul-out capacities are: marine railway, 65 feet; lift, 20 tons. The **harbormaster** at the State marina assigns slips in the small-boat basin; a fuel float is on the west side of the basin, and the harbormaster's office is on the east side.

The highway bridge, 1.5 miles above Absecon Inlet entrance, has a fixed span with a clearance of 60 feet. Two fishing piers, the remains of a former bascule bridge, are about 50 yards northward of the bridge. Care must be exercised when passing through this bridge, because of the strong currents; velocities of 2.5 knots have been reported.

Great Egg Harbor Inlet, 7 miles southwest of Absecon Inlet, has a controlling depth of about 6 feet over the bar. The buoys marking the inlet are not charted because they are shifted frequently to mark the best water. The inlet is used by many local fishing and pleasure boats with drafts up to 5 feet. Breakers extend along the bar even in moderate weather and are hazardous to small boats. Local knowledge is advised at all times in entering the inlet. The mean range of tide is 3.8 feet in the inlet. The bridges, just inside Great Egg Harbor Inlet, are described in chapter 5 in connection with the New Jersey Intracoastal Waterway.

Ocean City, a large summer resort on the southwest side of Great Egg Harbor Inlet, has rail and highway connections with the mainland. Supplies and facilities are described in connection with the New Jersey Intracoastal Waterway. **Great Egg Coast Guard Station** is in a basin on the inner side of the city. **Storm warning signals are displayed.** (See chart.)

Corson Inlet, 14 miles southwest of Absecon Inlet, is subject to constant change in depth and should not be used.

A shoal, covered 16 feet and marked by a buoy, is 3.8 miles east of Townsends Inlet. **Avalon Shoal,** covered 26 feet and marked by a lighted bell buoy, is 7 miles east-southeast of Townsends Inlet.

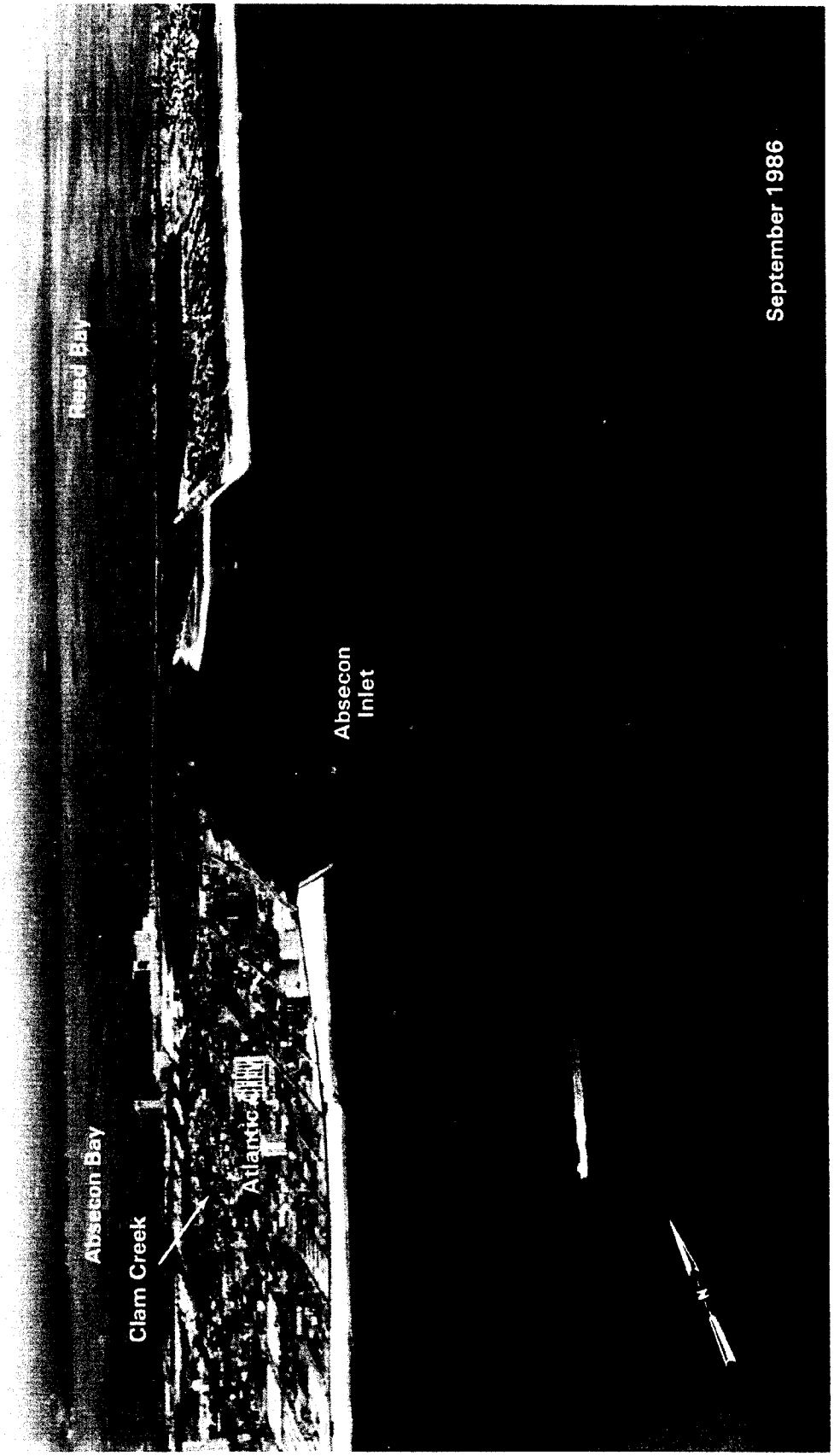
Townsends Inlet, 20 miles southwest of Absecon Inlet, is subject to considerable changes in position and depth, and is used principally by pleasure craft. Channel buoys are not charted, because they are shifted frequently to mark the best water. The mean range of tide is 3.8 feet in the inlet. The depth over the bar is about 4 feet.

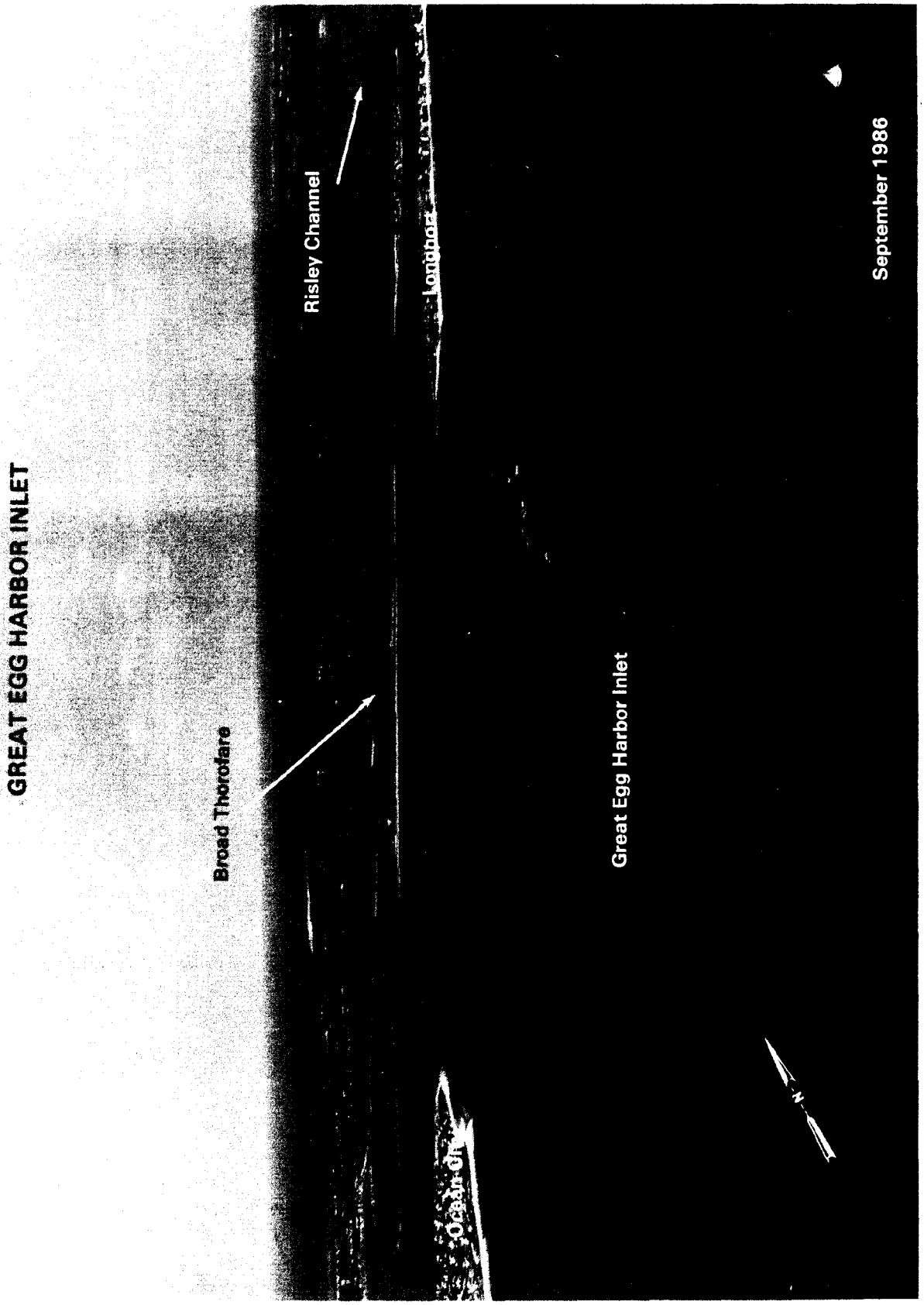
Townsends Inlet is a small resort on the northeast side of the inlet. A seasonal Coast Guard station is on the northeast side of the resort.

The highway bridge over Townsends Inlet has a bascule span with a clearance of 23 feet. (See **117.220,** chapter 2, for drawbridge regulations and opening signals.) The route of the New Jersey Intracoastal Waterway is just west of the bridge.

Hereford Inlet, 28 miles southwest of Absecon Inlet, is subject to rapid change. Breakers form at all times on the shoals and in moderate weather on the bar. The approach to the inlet is extremely dangerous with a following sea. The mean range of tide is 4.1 feet in Hereford Inlet. The depth over the bar is about 4 feet, but passage should not be

ABSECON INLET




GREAT EGG HARBOR INLET
Broad Thorofare
Risley Channel
Longport
Great Egg Harbor Inlet
Ocean City
N
September 1986

attempted without local knowledge. A lighted bell buoy marks the approach to the inlet.

Hereford Inlet Light (39°00.4'N., 74°47.5'W.), 57 feet above the water, is shown from a white square tower with cupola on a white dwelling on the south side of the inlet.

Nummy Island is on the inner side of Hereford Inlet; the Intracoastal Waterway passes west of the island. Ocean Drive highway crosses Nummy Island and has drawbridges over **Great Channel,** which leads northward from the inlet, and **Grassy Sound Channel,** which leads westward; both bascule spans have a clearance of 15 feet. (See **117.1 through 117.59 and 117.733,** chapter 2, for drawbridge regulations.)

Supplies and facilities at Stone Harbor and Wildwood are described with the New Jersey Intracoastal Waterway, chapter 5.

Charts 12317, 12316, 12214.–Cape May Inlet (38°56.2'N., 74°51.8'W.), 34 miles southwest of Absecon Inlet, is protected by jetties whose lights are inshore of the submerged ends. A fog signal is at the west jetty light, and a radiobeacon is at the inshore end. A **327°** lighted range marks the channel between the jetties. Buoys mark the channel inside the harbor. At night the lights on the towers on the east side of the inlet are visible from well offshore.

The **danger area** of a Coast Guard rifle range extends from **Sewell Point** westward from Cape May Inlet. (See **334.100,** chapter 2, for limits and regulations.)

Cape May Harbor is used by fishing fleets, pleasure craft, and the Coast Guard. The fishing vessels operate from wharves below and above the bridge at the northeast end of the harbor and from wharves in **Schellenger Creek,** at the west end of the harbor. Pleasure-craft facilities are on the north and west sides of the harbor. **Cape May Coast Guard Training Center** and its attendant facilities are on the south side of the harbor.

The resort town of **Cape May** fronts the ocean 2 miles west of Cape May Inlet.

Quarantine, customs, immigration, and agricultural quarantine. (See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

In July-August 1987, the controlling depth was 11 feet through Cape May Inlet to the inner ends of the jetties; then 9½ feet to the Coast Guard large wharf on the south side of the harbor; then 12 feet at midchannel to Schellenger Landing, at the mouth of Schellenger Creek; then in 1972, 9 feet through Schellenger Creek; then in 1981, 4 feet reported at midchannel proceeding northward through Spicer Creek Canal, which connects with the Cape May Canal. Traffic through Schellenger Creek is restricted by the 38–foot-wide bascule span of the highway bridge with a clearance of 4 feet that remains in the closed position. (See **117.1 through 117.59 and 117.750,** chapter 2, for drawbridge regulations.) The controlling depth is about 13 feet to the fish wharves above the bridge at the northeast end of the harbor.

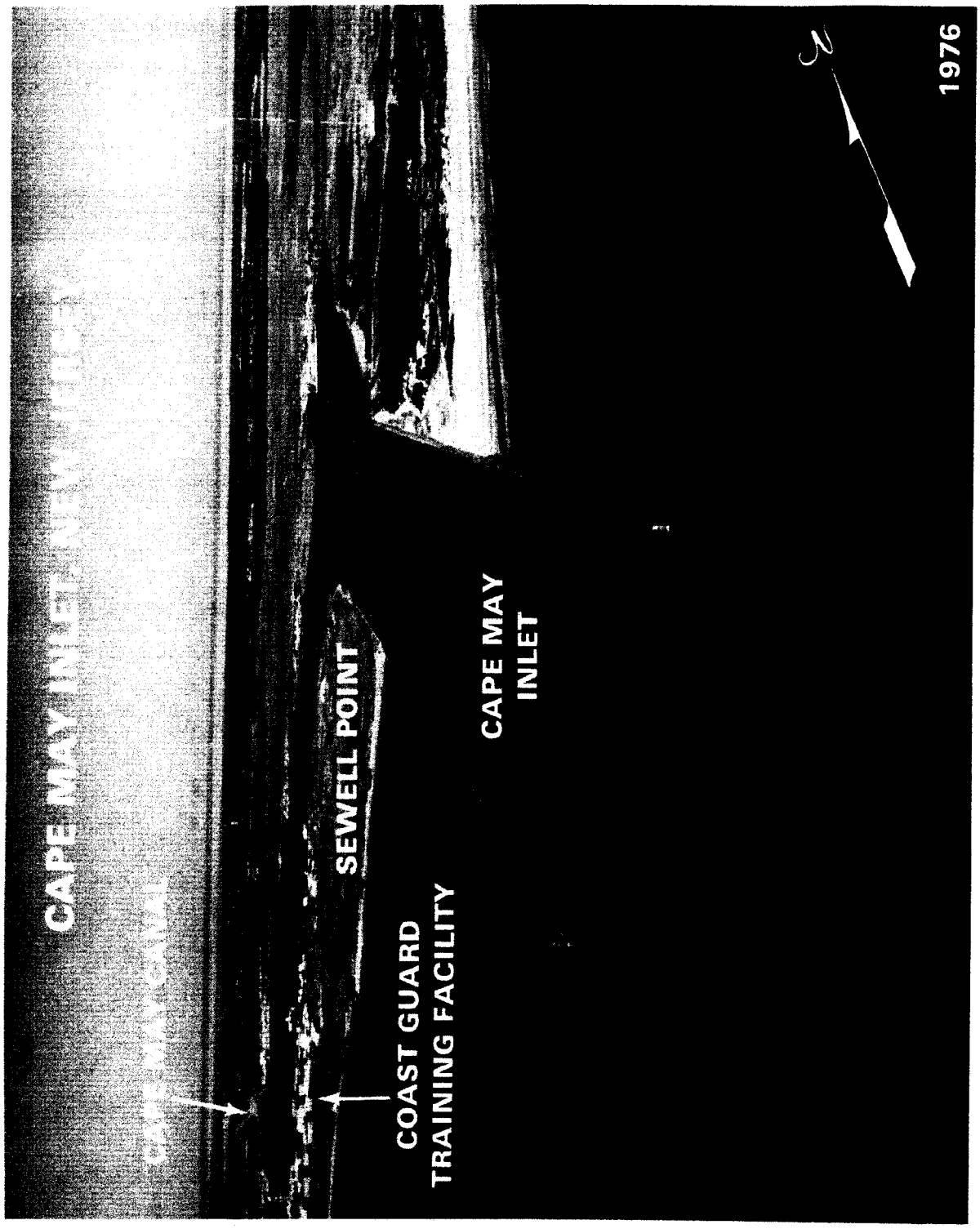
The mean range of tide is 4.4 feet in Cape May Harbor. The current velocity is about 2 knots in Cape May Inlet.

Most of the fishing and small-craft facilities are along the northern and western sides of Cape May Harbor, and in Schellenger Creek. (See the small-craft facilities tabulation on chart 12316 for services and supplies available.)

Storm warning signals are displayed. (See chart.)

The Coast Guard piers on the inner side of Sewell Point are the largest in the harbor and have depths of 15 feet to 10 feet alongside.

The waterway to **Jarvis Sound,** at the northeast end of Cape May Harbor, and through Cape May Canal at the west end, is described with the New Jersey Intracoastal Waterway, chapter 5.


CAPE MAY INLET, NEW JERSEY
SEWELL POINT
COAST GUARD
TRAINING FACILITY
CAPE MAY
INLET
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5. INTRACOASTAL WATERWAY

The **Intracoastal Waterway 12324, 12316** is a toll-free passage which roughly parallels the Atlantic Coast and extends 118 statute miles through bays, lagoons, thorofares, and land cuts from Manasquan Inlet to Delaware Bay at a point 2 miles north of Cape May Light.

In addition to the Intracoastal Waterway and the waters through which it passes, this chapter also describes the several rivers and tributaries that empty into these waters, as well as some of the more important towns and landings along these waterways.

The Intracoastal Waterway is used mainly by pleasure craft, and commercial and sport fishing vessels. The U. S. Army Corps of Engineers, Philadelphia Engineer District, has supervision of the waterway's construction, maintenance, and operation. (See appendix for address.)

Mileage.–The Intracoastal Waterway mileage is zeroed in 40°06′03″N., 74°01′55″W., off the outer ends of the Manasquan Inlet jetties, which are 40 nautical miles by outside run from The Battery, N.Y.

Distances along the Intracoastal Waterway are in statute miles to facilitate reference to the small-craft charts 12324, 12316; all other distances are nautical miles. Mileage conversion tables are on page T–22.

Channels.–The channel of the Intracoastal Waterway is generally 100 feet wide and has dredged depths of 6 feet from Manasquan Inlet to Cape May Harbor, thence 12 feet through Cape May Canal to Delaware Bay.

Effort is made to maintain a 6-foot controlling depth for the waterway, but due to continuous shoaling, 3 feet or less may be found in places, particularly inside the ocean inlets. (See Local Notice to Mariners and latest editions of charts for controlling depths.)

Bridges and cables.–Minimum clearances of bridges and cables crossing the Intracoastal Waterway are as follows:

From Manasquan Inlet to Absecon Inlet: clearance of overhead cables, 72 feet, **Mile 3.0;** horizontal clearance, 47 feet at bascule bridge, **Mile 3.0;** vertical clearance, 60 feet at fixed bridge, **Mile 14.1** and **Mile 37.4.** A vertical-lift bridge at **Mile 3.9** has clearances of 30 feet down and 65 feet up.

From Absecon Inlet to Delaware Bay: vertical clearance, 35 feet at fixed bridges, **Miles 68.9, 84.3, 93.6, and 97.4;** clearance of overhead cables, 55 feet, **Mile 84.3;** horizontal clearance, 49 feet at bascule bridge, **Mile 78.0.**

General drawbridge regulations and opening signals for bridges over the Intracoastal Waterway are given in **117.1 through 117.49,** chapter 2. **Special drawbridge regulations** for certain bridges that supplement the general regulations are referenced with the area description of the waterway.

Aids to navigation.–The U.S. Coast Guard maintains the standard aids that mark the inlets and the special aids that mark the Intracoastal Waterway. The special aids have characteristic yellow markings which distinguish them from aids to navigation marking other waters. (See U.S. Coast Guard Light Lists or Chart 1 (Nautical Chart Symbols and Abbreviations) for illustrations of special markings.)

The Department of Environmental Protection, State of New Jersey, maintains the aids to navigation on the rivers and creeks that empty into the New Jersey Intracoastal Waterway.

Lights and daybeacons should not be passed close aboard because those marking dredged channels are usually placed back from the bottom edge of the channel and others may have riprap mounds around them to protect the structures.

The buoys marking the waterways are frequently shifted with changing channel conditions.

Charts.–Navigation of the Intracoastal Waterway can be made easier by the use of the special small-craft series which the National Ocean Service publishes especially for that purpose.

Tides.–In the inland waters, the tides are greatly affected by the winds both in time and height, westerly winds producing low water and easterly winds high water. In Barnegat Bay, northerly and southerly winds drive the water to the ends of the bay. While the normal range of tide is only about 0.5 foot in sections of the waterway removed from the inlets, strong winds of long duration may cause variations in level of as much as 3 feet below mean low water or 3 feet above mean high water. Near the inlets, the wind has less effect and the normal range of tide is 3 to 4 feet.

Currents.–Current velocities may reach 3 knots in the inlets and in the narrow channels that connect the inlets with the inside waters.

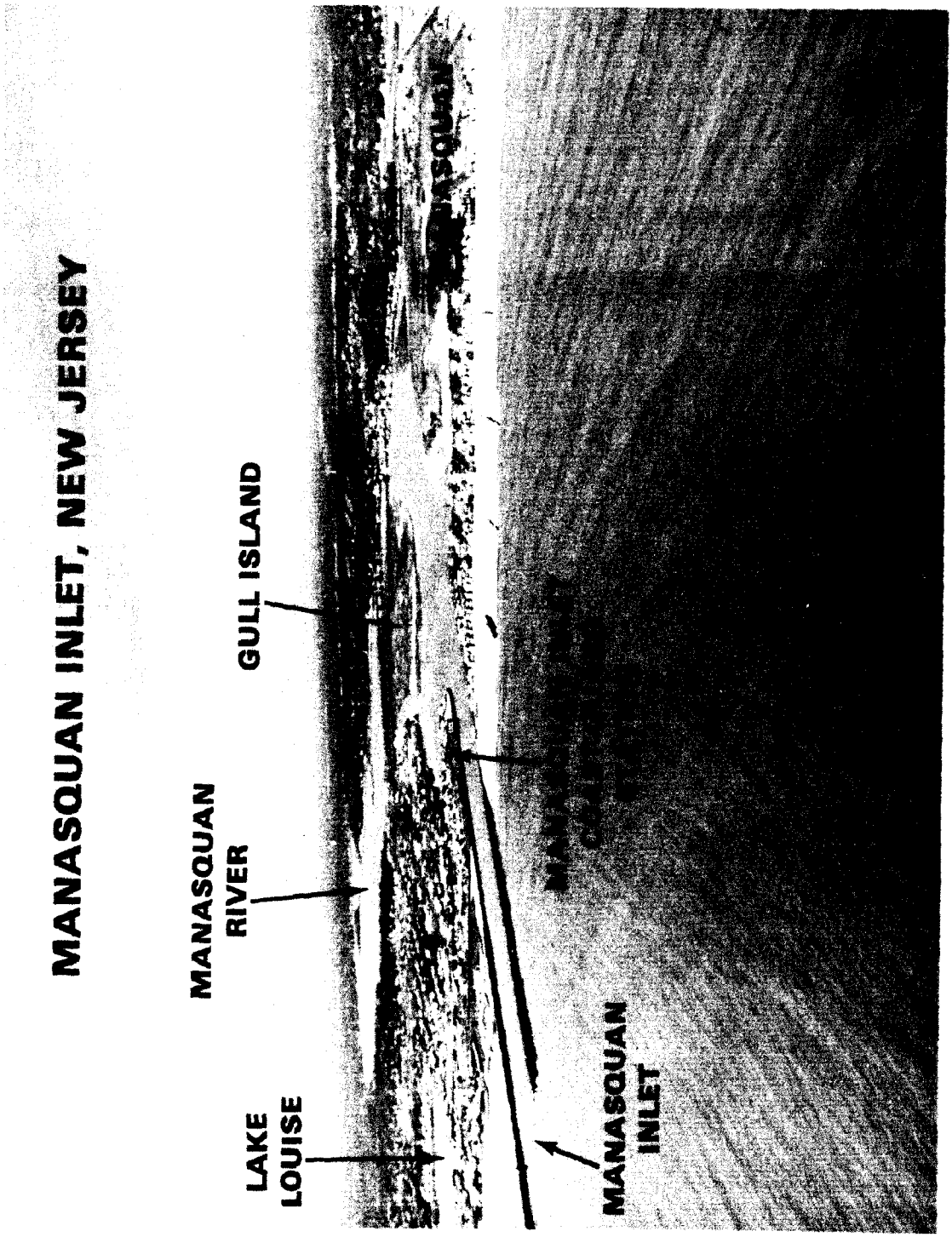
Ice.–The inside waters are completely closed to navigation by ice during extreme winters. In ordinary winters, some of the channels, especially near the inlets where the currents are strong, remain open most of the time, though ice always forms on the flats. The inlets themselves are rarely closed, but passage is often difficult because of running ice. All the principal inlets and adjacent channels are used in winter by local fishing boats, but through navigation is usually blocked.

Weather.–While the waterway is more protected than the open waters weather is critical since navigation is more confined. Winds diminish over land due to surface friction. However, winds and currents may be intensified in restricted channels and inlets. November through April is the windiest time of the year. Gales are encountered about 1 to 2 percent of the time while speeds greater than 16 knots occur about 10 to 17 percent of the time. Fog is also a problem particularly in restricted waterways. Visibilities drop below 0.5 mile on about 2 to 5 days per month; they are best from mid to late summer. During the fall and early winter radiation fog often reduces morning visibilities but usually burns off by afternoon. At times in spring, advection fog from the open water may be carried ashore by winds with an easterly component. Smoke and precipitation also add to the problem in all seasons.

Seas can be a problem at ocean entrances such as Manasquan Inlet, Barnegat Inlet, and Little Egg Inlet. This is true with strong winds between northeast and south, particularly on an ebb tide.

Storm warning signals are displayed at various places along the New Jersey Intracoastal Waterway and connecting channels. Display locations are shown on the NOS charts.

Facilities.–At communities along or adjacent to the waterway are numerous piers, wharves, and docks, many of which are open to general public use. Fuel, water, and other supplies are readily available. Public and privately owned boat basins are located in many streams entering the bays and thorofares through which the waterway passes. Boat-repair and storage yards with marine railways are also scattered along the waterway. Facilities for icing, storing, and shipping seafood are available at most of the larger


MANASQUAN INLET, NEW JERSEY
LAKE LOUISE
MANASQUAN RIVER
GULL ISLAND
MANASQUAN INLET

Charts 12316, 12324.–Manasquan Inlet, 22 miles southward of Sandy Hook Light, is the northern terminus of the New Jersey Intracoastal Waterway, and the Atlantic entrance to shallow **Manasquan River,** which flows into the inlet from the westward. The inlet is used by many commercial fishing craft and pleasure craft. Mariners should exercise caution when entering Manasquan Inlet when the wind and tide are opposed; local knowledge is advised. **Manasquan Inlet Coast Guard Station** is on the south side of the inlet. **Storm warning signals** are displayed. (See chart.)

Traffic conditions in Manasquan Inlet can be hazardous due to the large volume of commercial and pleasure boat traffic. Mariners are advised to exercise caution and control speed and wake while transiting the inlet. The Coast Guard monitors traffic in the inlet and safe boating is enforced.

A marked dredged channel, protected at the inlet entrance by two jetties, leads through Manasquan Inlet and extends about 5 miles up Manasquan River. In January 1986, the midchannel controlling depth was 9½ feet through the entrance to within 100 yards of the first bridge, then in 1979, 4 feet to a point just north of the entrance to Point Pleasant Canal, then in 1967, reported centerline depths of 6 feet to the third bridge, then 3 feet for about 1.2 miles to the channel bend at Turkey Point, and then in 1968, a reported centerline depth of 2½ feet to a small-craft basin at the end of the dredged channel.

The north jetty is marked by a light on its outer end. The south jetty is marked by a light near the outer end; a fog signal is at the south jetty light, and a radiobeacon is close inshore of the light. Give the jetties a good berth to avoid any loose rocks.

The mean range of tide is 4 feet in Manasquan Inlet and 3.5 feet at the railroad bridge **(Mile 1.0).** The current velocity is about 1.8 knots in the inlet.

The resort towns of **Manasquan** and **Point Pleasant Beach** are on the north and south sides of Manasquan Inlet, respectively, while the towns of **Brielle (Mile 1.3), Point Pleasant (Mile 2.6),** and **Riviera Beach** (3.5 miles above the inlet jetties) are on Manasquan River.

Cooks Creek, Mile 0.4, is an outlet for **Lake Louise** on the south side of Manasquan River. The fixed highway bridge over the creek has a 28-foot channel span with a clearance of 8 feet. Depths are about 6 feet below the bridge decreasing to 2 feet above it.

Crabtown Creek, Mile 0.9, enters Manasquan River on the north side. The staked channel has a controlling depth of about 5 feet for 0.7 mile into the northwest fork. The highway bridge over the creek has a 31-foot bascule span with a clearance of 9 feet. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.)

The railroad bridge at **Mile 1.0** has a 48-foot bascule span over Manasquan River with a clearance of 3 feet. The bridgetender monitors VHF-FM channel 13 (156.65 MHz); call sign, KT-4203. The State Route 35 highway bridge at **Mile 1.3** has a bascule span with a clearance of 30 feet. (See **117.1 through 117.59 and 117.733,** chapter 2, for drawbridge regulations.) The overhead power cable on the west side has a clearance of 107 feet. The current velocity is about 2.2 knots at the highway bridge.

The State Route 70 highway bridge over Manasquan River at Riviera Beach has a bascule span with a clearance of 15 feet. (See **117.1 through 117.59 and 117.727,** chapter 2, for drawbridge regulations.)

Small-craft facilities are along Cooks Creek, Crabtown Creek, and tributaries, and up Manasquan River near the two bridges a mile inside Manasquan Inlet, and near Point Pleasant and Riviera Beach. Commercial fishing wharves and other small-craft facilities are along **Wills Hole Thoroughfare,** westward of Cooks Creek; controlling depth is about 8 feet. (See the small-craft facilities tabulation on chart 12324 for services and supplies available.)

From Manasquan Inlet, the New Jersey Intracoastal Waterway follows the dredged channel in Manasquan River to **Mile 2.7** where it turns south into the **Point Pleasant Canal.** The 1.9-mile narrow land cut has bulkheaded sides; vessels are required to pass through at a safe speed to avoid damage to structures and boats. Currents of up to 9 knots may be encountered at the bridges across the canal causing a turbulent effect, particularly at times of maximum ebb and flood; vessels running with the current may experience difficulty in maneuvering at the bridges; other small craft should act accordingly.

In 1971, the National Ocean Service conducted a visual inspection of the hazardous tidal current conditions existing in the Point Pleasant Canal. Hazardous conditions, causing navigational difficulties, are most prevalent at the Point Pleasant Canal Route 88 highway bridge. These conditions stem from riprap which was placed in the canal at the bridge to control serious erosion problems. Current meter measurements indicate that the velocity of the water has increased in the areas where rock was placed and has aggravated the already existing tidal conditions, from the reduction in cross-sectional area of the canal by the bridge and also the irregular bottom.

Local sources, including both bridge tenders and the Marine Police, verified present data which indicate that the tides are greatly affected by winds, therefore, diminishing any regularity in the tidal cycle.

Mariners should consider the following precautionary measures before transiting the canal:

1. The time differential of the tidal cycle between the Mansaquan reference station, located at the railroad bridge crossing the Manasquan River, and Point Pleasant Canal is reported to be about 3 hours.

2. The safest time to transit the canal is at slack high water, at which time the average velocity in the canal is at a minimum. During slack low water, there is a slight increase (0.2 knot) in velocity as compared to slack high water.

3. Existing wind conditions, in relation to tides, are extremely important factors to be considered when picking the time to transit.

4. Navigators should be especially precautious of two-way traffic and of following too close, particularly at the bridges. Previous surveys indicate that the bridge opening areas are susceptible to standing waves from boat traffic which migrate up and down the canal and do not dissipate for 20 to 30 minutes.

At **Mile 3.0,** State Route 88 highway bridge crosses the canal to the town of **Point Pleasant,** on the east side of the canal; the bridge has a bascule span with a clearance of 10 feet. An overhead TV cable is on the north side of the bridge, and an overhead power cable is on the south side; least clearance, 72 feet. In 1985, a replacement vertical lift highway bridge was under construction immediately south of the highway bascule bridge, with design clearances of 105 feet in the up position and 65 feet in the down position.

At **Mile 3.9,** a vertical-lift highway bridge with a clearance of 30 feet down and 65 feet up crosses the canal. A small marina on the east side of the canal, at **Mile 4.1,** has gasoline, marine supplies, and a 25-ton lift for hull and engine repairs.

At **Mile 4.6,** the waterway route leaves the canal and passes through **Barnegat Bay,** which has a north-south length of about 25 miles. The western half of the bay has

depths of 5 to 10 feet; the eastern half is mostly extensive flats.

Complete fuel, supply, repair, and berthing facilities are available in **Bay Head Harbor** at the north end of Barnegat Bay; maximum haul-out capacities; railway, 80 feet; lift, 35 tons. The mean range of tide is 0.5 foot.

Beaverdam Creek enters the west side of Barnegat Bay opposite **Mile 4.8.** The marked channel into the creek has a controlling depth of about 3 feet. The Beaverdam Road highway bridge, 0.4 mile from the mouth, has a swing span with a 40-foot channel width and a clearance of 14 feet. (See **117.1 through 117.59 and 117.705,** chapter 2, for drawbridge regulations.) The overhead power cable on the east side of the bridge has a clearance of 62 feet. (See the small-craft facilities tabulation on chart 12324 for services and supplies available.)

Metedeconk River, separated from Beaverdam Creek by **Wardells Neck,** flows eastward into Barnegat Bay. The northern approach to the river is the same as for Beaverdam Creek; the southern approach is a marked passage between **Herring Island** and **Metedeconk Neck.** The controlling depth into the river is about 4 feet; depths above the entrances are 5 to 8 feet for about 3 miles.

Laurelton, 4 miles up Metedeconk River from the Intracoastal Waterway, has facilities for small craft. Under average conditions, boats drawing as much as 3 feet can maneuver the shallow channel to Laurelton; the mean range of tide is almost negligible, and the wind has much more effect than the tide. (See the small-craft facilities tabulation on chart 12324 for services and supplies available.)

At **Mile 6.3,** the County Route 528 bascule highway bridge over Barnegat Bay to **Mantoloking** on the barrier beach has a clearance of 14 feet. (See **117.733,** chapter 2, for drawbridge regulations.) There are facilities on the west side of the waterway on both sides of the bridge. Fuel, supplies, repairs, and slips are available; maximum haul-out capacities; railway, 75 feet; lift, 50 tons.

Caution: In July 1983, numerous stakes were reported on the west side of the waterway in the vicinity of **Mile 7.3,** in about 40°01′55″N., 74°03′50″W.

Kettle Creek flows southeastward into Barnegat Bay opposite **Mile 9.6.** The creek has depths of 4 feet to the forks, 1.4 miles above the mouth. Gasoline and some supplies are available.

Shelter Cove, on the west side of Barnegat Bay at the entrance to **Goose Creek,** opposite **Mile 12.8,** has gasoline, some supplies, and slips. Repairs can be made; lift, 5 tons. The controlling depth into the cove is about 5 feet.

A marked 6-foot channel follows the inner barrier beach from **Lavallette,** east of **Mile 10.7,** to **Seaside Heights,** east of **Mile 14.1.** The 31-foot-wide fixed bridge to **West Point Island,** east of **Mile 12.6,** has a clearance of 10 feet, but with local knowledge, the bridge can be bypassed through the narrow channel west of the island.

There are many facilities along the inner barrier beach from **Mile 9.5** to **Mile 16.0.** (See the small-craft facilities tabulation on chart 12324 for services and supplies available.)

At **Mile 14.1,** State Route 37 highway bridge over Barnegat Bay has a bascule span with a clearance of 30 feet. (See **117.1 through 117.59 and 117.733,** chapter 2, for drawbridge regulations.) The fixed span of this bridge between **Pelican Island** and Seaside Heights has a clearance 15 feet. A fixed highway bridge with a clearance of 60 feet is adjacent northward of the bascule bridge.

The municipal dock, 0.2 mile south of the bridge on the inner side of Seaside Heights, has depths of about 7 feet at the face.

Toms River, which empties into the west side of Barnegat Bay at **Mile 14.6,** has midchannel depths of 5 to 7 feet. The mean range of tide is 0.6 foot in the river. The channel is well marked. In October 1982, shoaling to an unknown extent was reported about 0.25 mile south of Long Point in about 39°56′00″N., 74°08′19″W.

The sea **boundary** between the First and Fifth Coast Guard Districts is on the New Jersey coast at 39°57′N., which is about due east of the mouth of the Toms River.

Island Heights, on the high wooded point on the north side of Toms River, 1.7 miles above Barnegat Bay, has a public pier with about 5 feet alongside. Fuel, supplies, and slips are available at several facilities. Repairs can be made; largest haul-out capacities: railway, 50 feet; lift 5 tons.

The town of **Toms River,** 4 miles upriver from Barnegat Bay, is the head of navigation; controlling depth to the town is about 5 feet. There are complete fuel, supply, repair, and slip facilities; maximum haul-out capacities; railway, 55 feet; lift, 20 tons.

Gasoline, some marine supplies, and slips are available at a marina on **Goodluck Point at Mile 16.2.** Repairs can be made; largest lift, 20 tons.

In 1973, a piling, 6 inches in diameter and extending 1 foot above the water at low tide, was reported off Goodluck Point in about 39°56.1′N., 74°06.4′W.

Cedar Creek, which empties into the west side of Barnegat Bay at **Mile 20.2,** has depths of 3 to 4 feet. There is a light on the south side of the entrance to the creek. Small-craft facilities along the 1.4-mile navigable length of Cedar Creek have gasoline, supplies, and berths; repairs can be made; largest lift; 12 tons.

Forked River, on the west side of Barnegat Bay opposite **Mile 23.8,** is entered by a marked channel which leads to the head of navigation at the town of **Forked River,** about 1.8 miles above the bay. In October 1978, the controlling depth was reported to be 4½ feet. The river forks into three branches about halfway up; the town is on the north side of **North Branch.** Forked River is reported to afford excellent hurricane shelter.

There are several marinas and boatyards on both sides of North Branch. (See the small-craft facilities tabulation on chart 12324 for services and supplies available.)

A State marina is at the head of North Branch. The **harbormaster** at this facility assigns transient berths. The New Jersey Bureau of Coastal Engineering, Aids to Navigation Section, is based at the marina and can provide mariners with the latest information of conditions on the Intracoastal Waterway, and on other waters marked by the State of New Jersey.

Oyster Creek, on the west side of Barnegat Bay opposite **Mile 24.7,** has a navigable length of over 1 mile to Highway 9 bridge. In March 1981, the Coast Guard advised mariners that passage should not be attempted because of severe shoaling reported in the creek.

At **Mile 25.9,** Oyster Creek Channel leads eastward to Barnegat Inlet. The channel and the inlet were described in chapter 4.

Waretown, west of **Mile 26.3** on the bay shore, has many small-craft facilities along its easterly shore, and in **Waretown Creek,** on the north side of town, and in the small-boat basin, known as **Sanborn Anchorage,** on the south side of town. Controlling depths are about 4 feet in Waretown Creek and about 5 feet in Sanborn Anchorage. (See the small-craft facilities tabulation on chart 12324 for services and supplies available.)

Double Creek, southwest of **Mile 28.0,** is protected on the north side of its entrance by a jetty which has a light on its outer end. The channel is navigable to just above the fixed

highway bridge 0.7 mile above Barnegat Bay. (See the small-craft facilities tabulation on chart 12324 for services and supplies available.) In March 1981, the Coast Guard advised mariners that passage should not be attempted because of severe shoaling reported in the creek.

In July 1980, a submerged pile was reported in the channel about 20 feet east of Light 10 at **Mile 35.5.**

At **Mile 37.4,** a fixed highway bridge with a clearance of 60 feet over the intracoastal route through **Manahawkin Bay** connects the westerly shore of the bay with the barrier beach. The bridge also crosses three minor channels, one close to the westerly shore of the bay, one between the two marshy islands on the east side of the bay, and the other between the more easterly island and the barrier beach. Clearances over these minor channels, from north to east, are: 15 feet, 11 feet for a width of 27 feet, and 15 feet, respectively. An overhead power cable, on the north side of the bridge and submerged at the intracoastal route, parallels the bridge for its entire length. Overhead clearances elsewhere are: 19 feet between the westerly shore of Manahawkin Bay and the first island on the east side of the bay, 27 feet between the two islands, and 37 feet between the more easterly island and the barrier beach.

There are many small-craft facilities along the bay shore of **Long Beach** between Barnegat Inlet and Beach Haven Inlet. (See also chart 12316.) Most of these are near the bridge at **Mile 37.4,** at **Ship Bottom, Mile 39.0,** and at **Beach Haven, Mile 45.7.** (See the small-craft facilities tabulation on chart 12324 for services and supplies available.)

Westecunk Creek, 2 miles northwest of **Mile 42.5,** is marked at the entrance by a light. A marked channel leads from Little Egg Harbor to a public landing 2.5 miles above the mouth of the creek. In 1966-1972, the channel had a reported controlling depth of 6 feet. The town of **West Creek** is 0.3 mile west of the landing. Small-craft facilities are on the southwesterly side of the creek. (See the small-craft facilities tabulation on chart 12324 for services and supplies available.)

Chart 12316.–Little Egg Harbor has general depths of 4 to 6 feet in its northwestern part; in the southern part is a large group of marshy islands surrounded by a shallow area with depths of 1 to 3 feet. Buoys mark a race course in the harbor. Between some of these islands are narrow unmarked channels which begin and end abruptly in the shallow areas. The Intracoastal Waterway continues southward along the inner side of the barrier beach.

Parker Cove is on the north side of Little Egg Harbor about 3 miles northwest of **Mile 44.3. Parker Run,** marked by a light on the south side of the entrance, empties into the northwest corner of the cove. Depths of about 4 feet can be carried to a public dock on the north side of Parker Run, 0.3 mile above the entrance. Berthage and gasoline are available at the dock.

Tuckerton Creek empties into the west side of Little Egg Harbor about 4 miles northwest of **Mile 49.4.** A dredged approach, marked by lights, extends 1.6 miles southeastward from the mouth of the creek to the north end of **Story Island Channel.** In 1977-March 1984, the centerline controlling depths were 3 feet to the mouth of the creek; thence 2½ feet to **Parkers Landing,** 0.9 mile above the entrance; thence 2½ feet to **Scow Landing,** 1.6 miles above the entrance; and thence ½ foot to the milldam at **Tuckerton,** 1.8 miles above the mouth. An overhead power cable, 0.6 mile above the mouth, has a clearance of 50 feet.

The mean range of tide is 2.4 feet throughout the Tuckerton Creek channel. Cross currents may be experienced in the approach channel. A **speed limit** of 8 miles per hour is prescribed for the channel. (See **162.30,** chapter 2.)

There are numerous small-craft facilities along the creek, and on the north side of the approach channel below the entrance to the creek. (See the small-craft facilities tabulation on chart 12316 for services and supplies available.)

A **057°-237° measured course,** 5,280 feet long, is close northeastward of the dredged approach channel to Tuckerton Creek. The front markers are black piles with white square signs; the rear markers, on shore, are pilings with triangular daymarks.

At **Mile 50.2, Marshelder Channel,** with depths of 7 feet or more, makes northward and around the southwest side of **Story Island** for 2.5 miles to Little Egg Harbor and the dredged approach to Tuckerton Creek.

There are several thorofares through the marsh area south and west of Marshelder Channel, but **Little Sheepshead Creek** is the only one of any importance. This 2-mile winding passage from **Mile 50.7** of the Intracoastal Waterway to the eastern side of Great Bay is used extensively. In 1973, shoaling to 1 foot was reported in the creek in about 39°31′20″N., 74°19′16″W. The fixed highway bridge over Little Sheepshead Creek has an 18-foot channel span with a clearance of 14 feet; overhead power cables have a least clearance of 36 feet.

The waterway route skirts the inner ends of the shoals in **Beach Haven Inlet** and **Little Egg Inlet,** both mentioned in chapter 4, and continues westward through **Shooting Thorofare** and along the south side of **Great Bay,** which has general depths of 4 to 7 feet.

Big Creek, marked by a light at the entrance, empties into the north side of Great Bay opposite **Mile 55.0.** Depths of about 5 feet can be carried to a large marina 2 miles above the mouth. A highway bridge with a 30-foot fixed span and a clearance of 12 feet crosses the creek 1.2 miles above the mouth. Gasoline, berths, some marine supplies, and a 10-ton lift are available at the marina; hull, engine, and electronic repairs can be made.

Mullica River, which empties into the northwestern part of Great Bay, is navigable to a milldam 20 miles above the bay. A depth of about 4 feet can be carried across the Great Bay flats to the mouth of the river. Once inside the river, the water is deep and the midchannel is clear for a long distance.

Depths of 8 to 4 feet can be carried from the mouth of Mullica River to the bridge 16 miles above the entrance, and thence 2½ feet to within a mile of the milldam. A lighted cutoff, 3 miles above the mouth, has ample depth and reduces distances to points on the upper river by about 2 miles.

The navigation of Mullica River is fairly easy in the lower reaches, but the chart should be followed closely to avoid the unmarked 3-foot shoals in the entrance. The last few miles to the milldam are shallow, difficult, and full of stumps. The river is marked by lights and stake daybeacons as far as the first bridge; stake daybeacons mark the reaches above the bridge.

The fixed highway bridge, 6.5 miles above the mouth of Mullica River, has a clearance of 30 feet; overhead power cables, 500 feet above the bridge, have a clearance of 50 feet. A boatyard, 0.5 mile below the bridge, has an 8-ton lift; hull and engine repairs can be made, and gasoline and marine supplies are available. The highway bridge 13 miles above the mouth has a 30-foot bascule span with a clearance of 6 feet. The highway bridge, 16 miles above the mouth, has a 30-foot bascule span with a clearance of 5 feet. Gasoline, some supplies, and slips are available at small-craft facilities at **Green Bank** and **Sweetwater,** about 16 and 17 miles

above the mouth, respectively. Minor repairs can be made; largest lift, 3 tons.

Nacote Creek empties into the southwest side of Mullica River 4 miles above the mouth. Controlling depths are about 5 feet to the U.S. Route 9 highway bridge, 1.6 miles above the mouth of the creek, and thence 3 feet to **Port Republic,** at the head of navigation 3.6 miles from the mouth. The U.S. Route 9 bridge has a 30-foot bascule span with a clearance of 5 feet. The overhead power cable just below the bridge has a clearance of 57 feet.

State Route 575 drawbridge crosses the creek about 3 miles above the mouth. (See **117.1 through 117.59 and 117.732,** chapter 2, for drawbridge regulations.)

A boatyard is on the north side of the creek just below the U.S. Route 9 bridge. Berths and gasoline are available; minor hull and engine repairs can be made.

Bass River, which empties into the north side of Mullica River 5 miles above the mouth, has depths of about 4 feet to **New Gretna,** 2.4 miles above Mullica River. The U.S. Route 9 highway bridge at New Gretna has a 30-foot bascule span with a clearance of 9 feet. (See **117.1 through 117.59 and 117.703,** chapter 2, for drawbridge regulations.) The overhead power cable just below the bridge has a clearance of 42 feet. The fixed highway bridge just upstream has a clearance of 20 feet. Small-craft facilities, on both sides of the creek just below the bascule bridge, have berths, gasoline, diesel fuel by truck, water, ice, and marine supplies. Hull, engine, and electronic repairs can be made; largest lift, 25 tons.

Wading River, which empties into the north side of Mullica River 7.5 miles above the mouth, has depths of about 4 feet to State Route 542 highway bridge 4 miles upstream. The bridge has a 30-foot bascule span with a clearance of 5 feet. (See **117.1 through 117.59 and 117.759,** chapter 2, for drawbridge regulations.)

Mott Creek, on the west side of Great Bay, is marked by a light and has depths of about 4 feet to a bulkhead landing 1.5 miles above the mouth; gasoline and some supplies are available. The 2-mile thorofare that winds northward through the marshes from the Mott Creek landing to the mouth of Nacote Creek has a controlling depth of about 2 feet.

Oyster Creek, on the west side of Great Bay 0.7 mile south of Mott Creek, is marked by a light and has depths of 4 feet to the small fishing village of **Oyster Creek,** 0.3 mile from the mouth, and 0.2 mile beyond to a public landing where gasoline, diesel fuel, water, ice, berths, and some marine supplies are available.

The Intracoastal Waterway leaves Great Bay at **Mile 56.8** and follows **Main Marsh Thorofare** to **Little Bay,** and thence along the western side of Little Bay across the mouths of **Hammock Cove,** and **Perch Cove** and westward of **Shad Island.**

At **Mile 60.3,** an alternate route swings eastward in **Brigantine Channel,** which leads to **Brigantine Inlet,** mentioned in chapter 4. About 1.3 miles along the channel, the alternate route turns southward and follows **Obes Thorofare** along the inner side of Brigantine. The overhead power cable that crosses Obes Thorofare, 1.3 miles from Brigantine Channel, has a clearance of 47 feet.

There are many small-craft facilities along the bay side of **Brigantine. Baremore Quarters,** a cove on the inner side of Brigantine 2.3 miles along Obes Thorofare from Brigantine Channel, is a good harbor of refuge. (See the small-craft facilities tabulation on chart 12316 for services and supplies available.)

From Baremore Quarters, the alternate route follows **Bonita Tideway** along the city waterfront, then swings westward through **Golden Hammock Thorofare** and rejoins the main route at **Mile 64.2.** The total length of the alternate route is 7 miles. Depths of 5 feet or more are on the alternate route along the inner side of Brigantine, but the channel shoals as it nears the main Intracoastal Waterway route and can be navigated only by shallow drafts.

The main route of the waterway leaves Little Bay at **Mile 60.3** and continues along the northwestern side of **Grassy Bay,** a shoal area mostly bare at low water, to **Meadow Cut.** From this short land cut, the route follows the southeastern side of **Reed Bay** to and through **Gull Island Thorofare,** across the mouth of **Broad Creek,** through **Middle Thorofare,** where it is rejoined by the alternate route from Brigantine, and into Absecon Channel at **Mile 64.5,** which leads to Absecon Inlet and the marine facilities in Clam Creek at **Atlantic City.** (See chapter 4.)

Storm warning signals are displayed. (See chart.)

Absecon Channel, the marked approach to Absecon Creek through Absecon Bay, can be entered at **Mile 64.5** or through **Point Bar Thorofare** at **Mile 65.6. Absecon Bay** is shallow and bares in some places at low water.

Absecon Creek, which flows into the northwest side of the bay, is crossed by three fixed bridges, about 1.5 miles above the mouth, at **Absecon;** least clearance is 3 feet. A marked channel with depths of about 2 feet leads across Absecon Bay to the mouth of the creek. In August 1980, the reported midchannel controlling depth in the creek was 2 feet from the mouth to the bridges; the creek is reported navigable by small outboards for about 2 miles above the bridges. The mean range of tide is 3.6 feet at the mouth of Absecon Creek. A small-craft facility is on the north side of the creek, about 0.5 mile below the bridges. Gasoline, some marine supplies, a 33-foot marine railway, and a 10-ton lift are available; minor repairs can be made.

From Absecon Channel, the Intracoastal Waterway follows **Beach Thorofare** along the northwest side of Atlantic City. U.S. Route 30 highway bridge, over the thorofare at **Mile 67.2,** has a bascule span with a clearance of 20 feet.

The ConRail railroad bridge over Beach Thorofare at **Mile 68.9** has a swing span with a clearance of 5 feet. (See **117.1 through 117.59 and 117.733,** chapter 2, for drawbridge regulations.) The overhead power cables 200 yards north of the bridge have a clearance of 110 feet. A fixed highway bridge, 200 feet south of the railroad bridge, has a clearance of 35 feet.

The route of the Intracoastal Waterway leaves Beach Thorofare at **Mile 69.5** and continues along the inner side of Atlantic City by way of **Inside Thorofare.** Albany Avenue (U.S. Routes 40-322) Bridge, which crosses Inside Thorofare at **Mile 70.0,** has a bascule span with a clearance of 10 feet. (See **117.1 through 117.59 and 117.733,** chapter 2, for drawbridge regulations.) A fuel pier is on the southeast side of the bridge; overnight berthing, gasoline, and some marine supplies are available.

The Dorset Avenue highway bridge over the waterway at **Mile 71.2** connects **Ventnor Heights,** on the northwest side, with **Ventnor City,** on the beach; the bridge has a bascule span with a clearance of 9 feet. (See **117.1 through 117.59 and 117.733,** chapter 2, for drawbridge regulations.) Gasoline, diesel fuel, berths, water, ice, and marine supplies can be obtained at the small-craft facilities below and above the bridge at Ventnor Heights; hull and engine repairs can be made. Largest haul-out capacities: marine railway, 40 feet; lift, 5 tons.

The waterway turns sharply northwestward at **Mile 71.4** and follows **West Canal** along the southwest side of Ventnor Heights to **Mile 72.3,** where it rejoins Beach Thorofare and continues southwestward.

From **Mile 73.3** southwest of **Shelter Island,** a marked

channel with a controlling depth of about 3 feet leads northward along the eastern shores of **Shelter Island Bay** and **Lakes Bay** to **West Atlantic City,** 2.2 miles from the waterway. The channel continues along the north shore of Lakes Bay to the municipal boat basin and adjacent yacht club at **Pleasantville,** 3.4 miles from the waterway. Gasoline and some supplies are available.

The highway bridge over Beach Thorofare at **Mile 74.0** has a bascule span with a clearance of 14 feet. **Margate City** is on the beach south of the bridge. Several small-craft facilities are at Margate City. (See the small-craft facilities tabulation on chart 12316 for services and supplies available.)

At **Mile 75.4, Risley Channel** and **Dock Thorofare** leads northward for 2.2 miles to a marine basin near **Northfield.** Small-craft facilities, on the northwesterly side of Dock Thorofare, can provide gasoline, diesel fuel, water, ice, and marine supplies. Hull and engine repairs can be made; largest lift, 50 tons.

At **Mile 75.4** there is a choice of two routes to the inner side of Ocean City. The exposed route west of the **Longport** waterfront and across **Great Egg Harbor Inlet** has deeper water, but is restricted by the 25-foot clearance of the fixed highway bridge, 0.2 mile south-southwestward of **Mile 75.4.** Care is necessary when passing through the bridge to avoid the shoal making out into the channel from the west side. Repairs can be made at a boatyard just south of the bridge; lift, 18 tons. Gasoline is available. Currents are strong at the inlet crossing, and the route is exposed to heavy easterly seas. The highway bridge over the inlet, 0.4 mile eastward of **Mile 79.1,** has a bascule span with a clearance of 23 feet at the center. The bridgetender monitors VHF-FM channel 13; call sign WQZ-343.

The protected route is through Risley Channel and **Broad Thorofare,** but the channel is subject to continuous shoaling. State Route 152 highway bridge over Broad Thorofare at **Mile 78.0** has a 49-foot bascule span with a clearance of 9 feet. In May 1986, a replacement bridge with a design clearance of 53 feet was under construction adjacent to the existing bridge.

Ship Channel extends northwestward from **Mile 79.1** to Great Egg Harbor Bay. **Bass Harbor,** a narrow channel leading northward from Ship Channel 1.7 miles from the inlet bridge, has depths of about 10 feet in the entrance; State Route 52 fixed highway bridge, 0.3 mile north of the entrance, has a 14-foot channel span with a clearance of 6 feet.

Somers Point, on the north side of Ship Channel 2 miles from the inlet bridge, is a summer resort with wharves that have depths of 2 to 5 feet at their outer ends.

There are many marinas and boatyards in Bass Harbor and along Somers Point. (See the small-craft facilities tabulation on chart 12316 for services and supplies available.)

A 2-mile combination of highway bridges and causeways extends southeastward over the channels and islands in **Great Egg Harbor Bay** from Somers Point to Ocean City. The bascule span over Ship Channel has a clearance of 14 feet. The State Route 52 bascule span over the Intracoastal Waterway at **Mile 80.4,** on the inner side of Ocean City, also has a clearance of 14 feet. (See **117.1 through 117.59, 117.733, and 117.753,** chapter 2, for drawbridge regulations for the bridges over Ship Channel and the Intracoastal Waterway, respectively.)

The fixed highway bridges that cross Great Egg Harbor Bay, 2 miles westward of the bridge crossing the waterway at **Mile 80.4,** have central-span clearances of 50 feet. An older highway bridge, 0.2 mile to the westward, has a bascule span with a clearance of 14 feet. About 0.5 mile above the old bridge, an overhead power cable, with a clearance of 76 feet over the channel and 50 feet outside the channel, crosses near the head of the bay.

Patcong Creek, marked on the westerly side of the entrance by a light, empties into the north side of Great Egg Harbor Bay, 2.6 miles northwestward of the bridge at **Mile 80.4.** The depth over the bar at the entrance is about 3 feet. A fixed highway bridge, 0.5 mile above the mouth of the creek, has a clearance of 15 feet.

The fixed highway bridge, 2.8 miles above the entrance to Patcong Creek, has a channel span with a clearance of 8 feet. Another fixed highway bridge, 3.5 miles above the entrance, has a clearance of 7 feet; about 100 yards below this bridge, the decomposed piles of a former dam extend westward of midstream and are extremely dangerous. Gasoline, some supplies, and slips are available near the first bridge. Repairs can be made; lift, 10 tons.

Tuckahoe River, marked at the entrance by a light, empties into the south side of Great Egg Harbor 2.7 miles westward of the bridge at **Mile 80.4.** Controlling depths are about 2 feet across the flats at the entrance, thence 3 feet for 7 miles to the town of **Tuckahoe.** The overhead power cable, 1 mile below Tuckahoe, has a clearance of 41 feet. The State Route 50 highway bridge at the town has a 30-foot bascule span with a clearance of 9 feet. (See **117.1 through 117.59 and 117.757,** chapter 2, for drawbridge regulations.)

A boatyard is just below the bridge. Gasoline and some marine supplies can be obtained. Complete repairs can be made; a 120-foot marine railway and a 60-ton mobile hoist are available.

Cedar Swamp Creek empties into the south side of Tuckahoe River 4.3 miles above the river mouth. The creek has depths of about 4 feet to a highway culvert 2.5 miles from the river where a marine railway can haul out boats up to 25 feet for repairs.

Great Egg Harbor River is a northwestward continuation of Great Egg Harbor Bay. The controlling depth is about 4 feet from Great Egg Harbor Bay to Mays Landing, at the head of navigation. The overhead power cables between the bay and Mays Landing have clearances of 65 feet or more. The mean range of tide is 4.0 feet at Mays Landing.

Middle River empties into the southwest side of Great Egg Harbor River 0.5 mile above the bay. Depths of 4 feet can be carried up Middle River for 2 miles.

Powell Creek empties into the east side of Great Egg Harbor River 5 miles above the bay. Depths of about 2½ feet can be taken to the small-craft facilities about 0.5 mile above the mouth. Gasoline, berths, water, ice, and some marine supplies are available. Hull and engine repairs can be made; lift, 15 tons.

Small-craft facilities are on the east side of Great Egg Harbor River, about 8 miles above the mouth. Berths, gasoline, and water are available. Repairs can be made; lift, 15 tons.

Mays Landing, at the head of navigation on Great Egg Harbor River, is 12 miles from Great Egg Harbor Bay. The river water is nearly fresh at the town. The town bulkhead has depths of about 5 feet alongside. A marina here can provide gasoline, berths, water, ice, and some marine supplies. Minor hull and engine repairs can be made; marine railway, 50 feet; lift, 3 tons.

The Intracoastal Waterway continues southerly along the inner side of **Ocean City;** lagoons here accommodate craft drawing up to 5 feet. (See the small-craft facilities tabulation on chart 12316 for services and supplies available.) **Storm warning signals are displayed.** (See chart.)

The waterway follows **Beach Thorofare** to **Peck Bay;** the

mudflats bordering the channel through the bay are visible in some places at low water. The highway bridge at **Mile 84.3** has a fixed channel span with a clearance of 35 feet. An overhead power cable, close southward of the bridge, has a clearance of 55 feet. Just north of the bridge on the west side of the waterway, is a year-round, full service marina. Berths with electricity, gasoline, diesel fuel, water, and all types of repairs are available.

From Peck Bay, the route follows **Crook Horn Creek.** The railroad bridge over the creek at **Mile 86.6** has a swing span with a clearance of 2 feet. The west opening should be used, as the east one is obstructed. The swing span moves slowly.

The waterway enters **Middle Thorofare** at **Mile 88.0,** thence continues through **Ben Hands Thorofare** to **Mile 89.8** in **Main Channel,** which leads eastward and northward for 1.5 miles to the inner side of **Strathmere,** just south of Corson Inlet. The highway bridge over the waterfront channel at Strathmere has a bascule span with a clearance of 15 feet. The bridgetender monitors VHF-FM channel 13; call sign WQZ-342. There are several small-craft facilities at Strathmere; gasoline, berths, water, ice, and some marine supplies can be obtained. Engine repairs can be made; marine railway, 14 feet.

The waterway follows Main Channel southwestward, passing into shallow **Ludlam Bay** at **Mile 91.3** and enters **Ludlam Thorofare** at **Mile 92.5.** The fixed highway bridge at **Mile 93.6** has a clearance of 35 feet, and the overhead power cables crossing at **Mile 93.8** have a least clearance of 56 feet.

Sea Isle City, on the barrier beach at the southeast end of the bridge at **Mile 93.6,** has several basins with depths of 3 to 6 feet in the entrances and slightly more inside. (See the small-craft facilities tabulation on chart 12316 for services and supplies available.)

The Intracoastal Waterway enters **Townsend Channel** at **Mile 95.3** and follows the inner side of the resort known as **Townsends Inlet.** Gasoline, diesel fuel, water, ice, berths, and marine supplies are available at the small-craft facilities at Townsends Inlet. Engine repairs can be made; marine railway, 35 feet.

At **Mile 96.4,** the waterway is 300 yards west of the highway bridge over **Townsends Inlet,** described in chapter 4. **Avalon,** on the southwest side of the inlet, is separated from the waterway's **Ingram Thorofare** by a wide marsh area.

Cornell Harbor, a channel with a reported depth of 5 feet in March 1980, leads southeastward through the marsh from **Mile 96.8** to Avalon thence along the inner side of the resort.

Pennsylvania Harbor, 0.5 mile southwestward of Cornell Harbor, had a reported controlling depth of 6 feet in March-June 1980. **Princeton Harbor,** 0.2 mile southwestward of Pennsylvania Harbor, had a reported controlling depth of 6 feet in March-June 1980. Both waterways lead to the Avalon waterfront. The fixed bridges over the Avalon channel at the inner ends of the two harbors restrict passage between them or to the southwest to an overhead clearance of 4 feet.

Gasoline, diesel fuel, water, ice, berths, some marine supplies, and an 8-ton crane are available at Avalon. Gasoline, berths, water, ice, some marine supplies, and a 2-ton lift are available in Pennsylvania Harbor.

A fixed highway bridge with a clearance of 35 feet crosses Ingram Thorofare at **Mile 98.1.**

The waterway follows Ingram Thorofare westward to **Paddy Thorofare,** thence into shallow **Great Sound** at **Mile 98.9.** At **Mile 100.0,** the route leaves Great Sound and follows **Gull Island Thorofare** southward to the Stone Harbor waterfront.

Stone Harbor is a resort on the northeast side of Hereford Inlet. The highway bridge over the waterway at **Mile 102.0** has a bascule span with an 11-foot clearance. (See **117.1 through 117.59 and 117.733,** chapter 2, for drawbridge regulations.)

Several basins are along the Stone Harbor waterfront. (See the small-craft facilities tabulation on chart 12316 for services and supplies available.)

The waterway follows **Great Channel** southwestward along the Stone Harbor waterfront, then turns sharply westward at **Mile 103.3** and follows the northwestern shore of **Nummy Island.** The bridge over the channel that leads along the east side of Nummy Island to Hereford Inlet was described in chapter 4.

At **Mile 104.6,** the waterway route through **Grassy Sound Channel** is joined by the main channel from Hereford Inlet. The bascule bridge over the inlet channel was described in chapter 4.

Beach Creek, on the inner side of North Wildwood just south of Hereford Inlet, has depths of about 2 feet in the entrance, but deeper water inside. The fixed bridge, 0.4 mile above the entrance, has a channel width of 17 feet and a clearance of 5 feet.

The highway bridge over the waterway at **Mile 105.2** has a bascule span with an 8-foot clearance. The route enters **Grassy Sound** at **Mile 106.1** and follows a well-marked channel. In August 1983, the north-northwest abutment of the railroad bridge at **Mile 107.5,** at the southwestern end of Grassy Sound, had collapsed into the channel. In September 1983, the bridge was being dismantled; extreme caution is advised in this area. An overhead power cable near the bridge has a 100-foot clearance.

East of the bridge at **Mile 107.5,** a 5-foot channel leads along the northeast side of West Wildwood for 0.8 mile to the inner waterfront of **Wildwood.** Passage is limited by the 5-foot clearances of the fixed bridges that connect the two communities.

At **Mile 108.7, Post Creek** extends eastward from the waterway and widens into a small bay between Wildwood and West Wildwood. **Ottens Harbor,** a dredged slip with depths of about 10 feet, extends 0.5 mile southeastward from the mouth of Post Creek. Commercial wharves along the waterway can accommodate vessels up to 150 feet .

The highway bridge over the waterway at **Mile 108.9** has a bascule span with a 25-foot clearance.

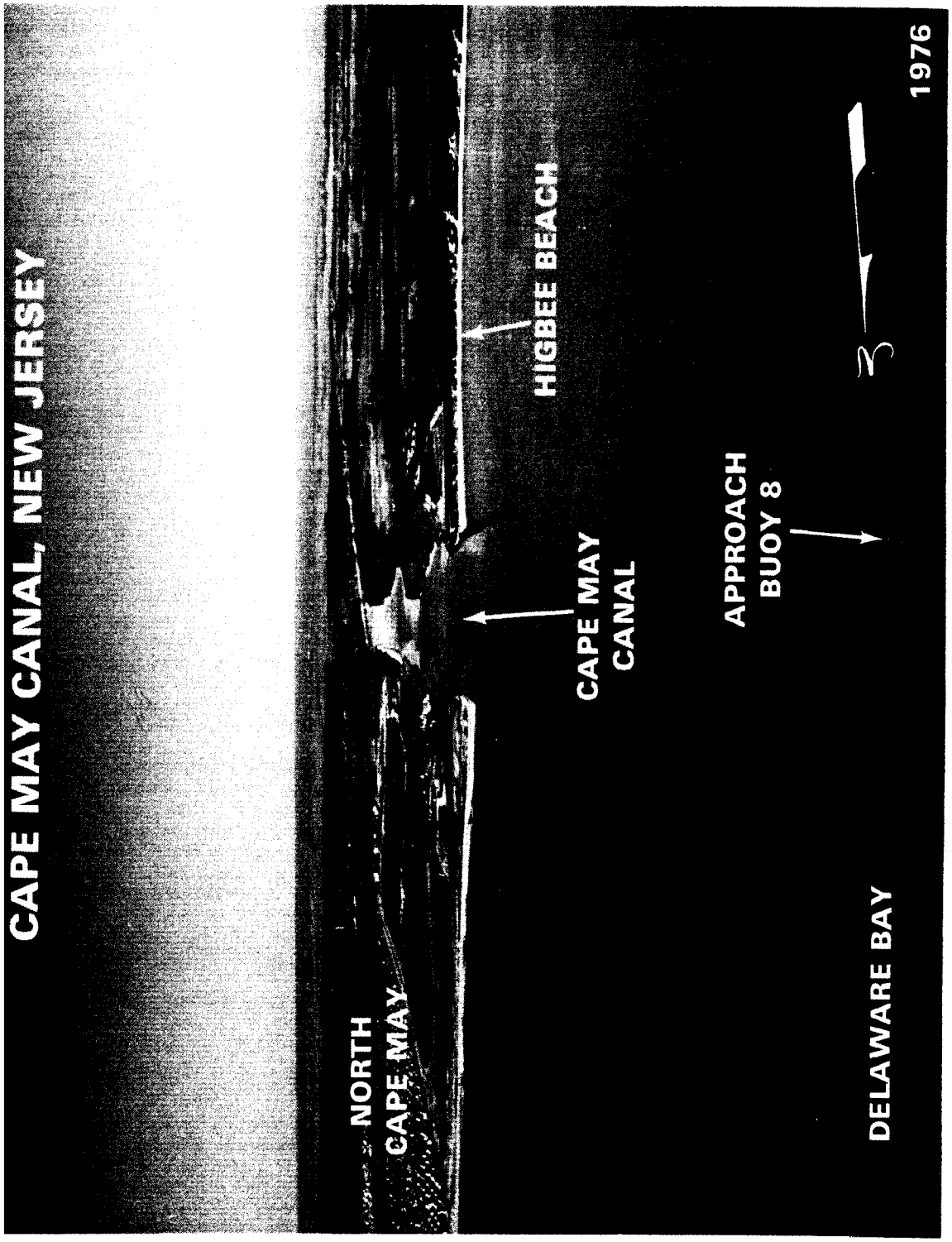
Sunset Lake, a comparatively deep basin on the inner side of **Wildwood Crest,** can be entered from either **Mile 109.3** or **Mile 110.2** of the Intracoastal route. The controlling depth is about 7 feet in the entrances.

Many small-craft facilities are along the Wildwood waterfront. (See the small-craft facilities tabulation on chart 12316 for services and supplies available.)

The waterway continues southward through **Jarvis Sound** and **Middle Thorofare.** The highway bridge over Middle Thorofare at **Mile 112.2** has a bascule span with a clearance of 23 feet. The bridgetender monitors VHF-FM channel 13; call sign WQZ-342. Just north of the bridge, **Lower Thorofare**leads eastward from the waterway for 0.3 mile, then turns northward. There is a long marginal fish wharf on the east side of Lower Thorofare; fuel and supplies are available.

The waterway route crosses the inner end of **Cape May Inlet** at **Mile 112.6** and continues westward through Cape May Harbor; the inlet and harbor were described in chapter 4.

Storm warning signals are displayed. (See chart.)


CAPE MAY CANAL, NEW JERSEY
NORTH CAPE MAY
CAPE MAY CANAL
HIGBEE BEACH
APPROACH BUOY 8
DELAWARE BAY
1976

Cape May Canal is entered at **Mile 114.1.** Vessels transiting the canal should limit their speed to 5 knots and should proceed with special care in the vicinity of the bridges. In February 1986, the controlling depth was 6 feet through the canal to Delaware Bay.

The mean range of tide is between 4 and 5 feet in Cape May Canal. The current velocity is 1.9 knots at the east end and 0.9 knot at the west end; passage of barge tows may be delayed because of tide and current conditions.

The fixed highway bridge, over Cape May Canal at **Mile 114.3,** has a clearance of 55 feet. The overhead power cable immediately northwestward of the bridge has a clearance of 75 feet. The railroad bridge at **Mile 115.1** has a swing span with a clearance of 4 feet. The overhead power cables on each side of the railroad bridge have a clearance of 75 feet. A fixed highway bridge with a clearance of 55 feet is about 200 yards westward of the railroad bridge. Two submerged dolphins, hazardous to navigation, are on the southern edge of the channel on the west side of the bridge. Mariners are advised to proceed with caution when transiting this area. At **Mile 115.5,** an overhead TV cable with a clearance of 60 feet crosses the canal.

The Cape May terminal of the **Cape May-Lewes Ferry** is on the north side of Cape May Canal at **Mile 117.3.** A private fog signal is on the terminal pier.

At **Mile 117.7,** Cape May Canal enters Delaware Bay between stone jetties which are 2 miles north of Cape May Light. The outer end of the jetties are marked by lights; a fog signal is on the north jetty.

Choppy seas are reported to form on Delaware Bay when the wind and tidal currents are contrary; it is especially hazardous at the entrance to Cape May Canal.

6. DELAWARE BAY

This chapter describes Delaware Bay and River, and their navigable tributaries, and includes an explanation of the Traffic Separation Scheme at the entrance to the bay. Major ports covered are Wilmington, Chester, Philadelphia, Camden, and Trenton, with major facilities at Delaware City, Deepwater Point, and Marcus Hook. Also described are Christina River and Schuylkill River, the principal tributaries of Delaware River, and other minor waterways, including Mispillion, Maurice, and Cohansey Rivers.

Navigation Guidelines for Bay and River Delaware.-The Coast Guard Captain of the Port, Philadelphia, and the Mariner's Advisory Committee for the Bay and River Delaware jointly recommend the following precautionary measures be taken while transiting in the Delaware Bay and River:

1. Special precautions should be taken at the time of first major vessel maneuvering. For vessels transiting above the Chesapeake and Delaware Canal, a manned anchor detail should be set (minimum of two qualified personnel on the forecastle at all times). Both anchors should be backed out to the water's edge and ready for letting go.

2. For a vessel calling at Marcus Hook, whether to anchor or dock,, tugs should be alongside and made fast between Lighted Buoy 6B and Buoy 8B on the Bellevue Range.

3. It is recommended that prior to arrival at the upper end of Liston Range, diesel vessels should change to a lighter fuel for maneuvering purposes.

4. Upon assuming responsibility for the piloting of a vessel and during the master/pilot exchange of information, it should be established that both steering engines and all main generators are operational. During this exchange of information, any special maneuvering characteristics of the vessel should be discussed.

5. All steering and main propulsion failures, no matter how extensive or intermittent, are considered hazardous conditions falling under the immediate reporting requirement of **33 CFR 160.215.** (See **160.215,** chapter 2.) When making those reports, the following information should be passed to the Captain of the Port to assist in making a vessel operation movement determinations:

(a) Vessel Name
(b) Flag
(c) Location
(d) On Scene Weather
(e) Visibility
(f) Length
(g) Draft
(h) Cargo
(i) Nature of problem
(j) Known cause
(k) Correction action (Does it address cause fully?)
(l) Pilot's and master's intended course of action/recommendation
(m) Impact on other traffic

COLREGS Demarcation Lines.–The lines established for Delaware Bay are described in **80.503,** chapter 2.

Chart 12214.–Delaware Bay and Delaware River form the boundary between the State of New Jersey on the east and the States of Delaware and Pennsylvania on the west. The bay is an expansion of the lower part of Delaware River; the arbitrary dividing line, 42 miles above the Delaware Capes, extends from Liston Point, Del., to Hope Creek, N.J. Deep-draft vessels use the Atlantic entrance, which is about 10 miles wide between Cape May on the northeast and Cape Henlopen on the southwest. Vessels with drafts less than 30 feet can enter Delaware River from Chesapeake Bay through the Chesapeake and Delaware Canal, which is described in chapter 7.

Mileages shown in this chapter, such as Mile 0.9E and Mile 12W, are the nautical miles above the **Delaware Capes** (or "the Capes"), referring to a line from Cape May Light to the tip of Cape Henlopen. The letters N, S, E, or W, following the numbers, denote by compass points the side of the river where each feature is located.

The approaches to Delaware Bay have few off-lying dangers.

The 100-fathom curve is 50 to 75 miles off Delaware Bay, and the 20-fathom curve is about 25 miles off. Depths inside the 20-fathom curve are irregular, and in thick weather a deep-draft vessel should not approach the coast closer than depths of 12 fathoms until sure of its position; the safest approach or passing courses would be outside Five Fathom Bank Lighted Horn Buoy F (38°47.3'N., 74°34.6'W.) and Delaware Lighted Horn Buoy D (38°27.3'N., 74°41.8'W.).

Cape May is the extensive peninsula on the northeast side of the entrance to Delaware Bay. **Cape May Light** (38°56.0'N., 74°57.6'W.), 165 feet above the water, is shown from a 170-foot white tower on Cape May Point. A special radio direction finder calibration station is at the light. (See Light List for details.)

The shoals off Cape May are mixed clay and sand and have the consistency of hardpan; the ridges run in approximately the same directions as the currents. **Cape May Channel,** 1 mile southwest of the cape, is an unmarked passage between shoals, with depths from 2 to 6 feet on either side. The channel is seldom used, and then only by fishing vessels and pleasure craft; local knowledge is required for safe passage.

The channels have strong currents, and many tide rips form near **Prissy Wicks Shoal,** which has depths as little as 2 feet about 2 miles south of Cape May Light. In Cape May Channel, the current velocity is 1.5 knots on the flood and 2.3 knots on the ebb.

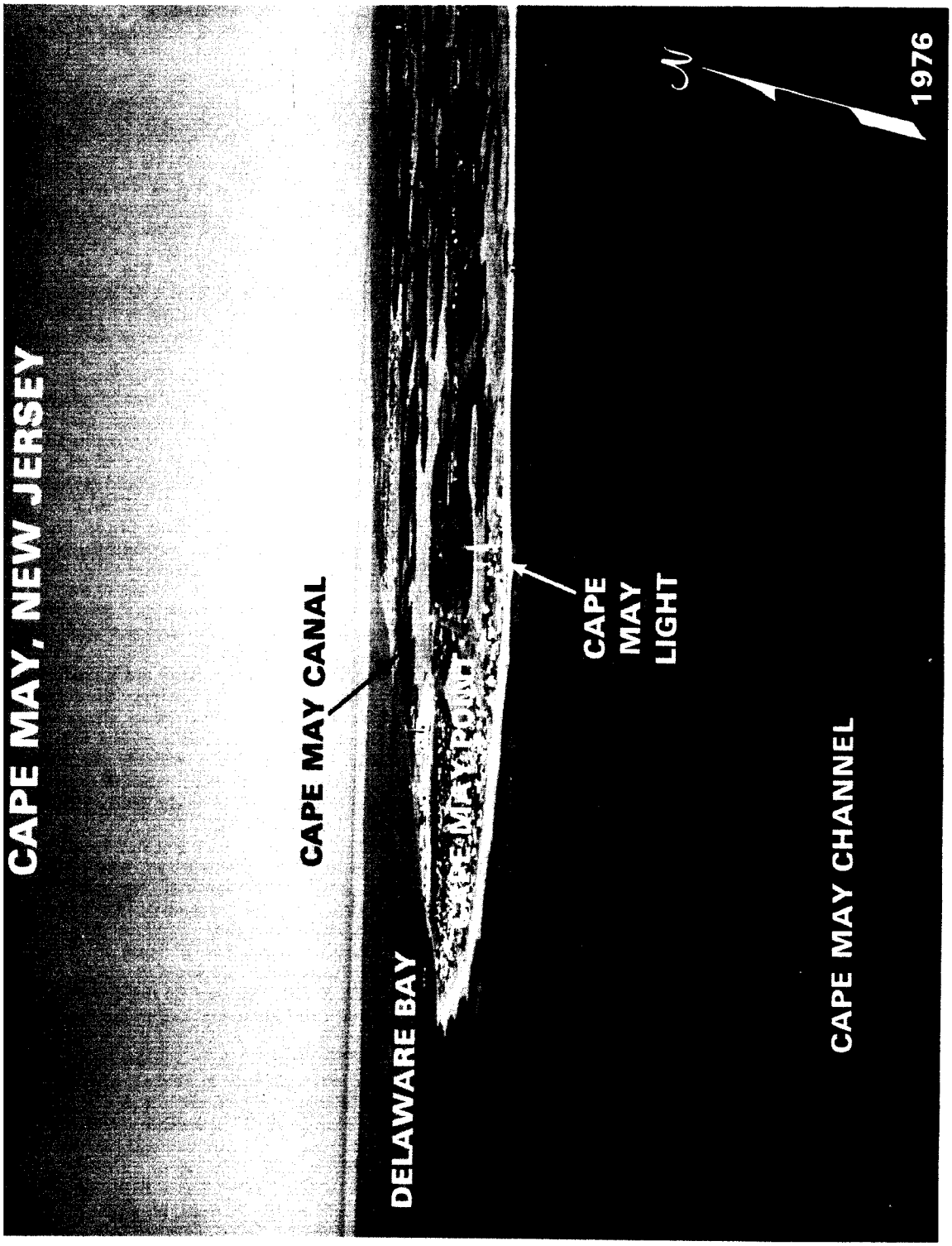
Overfalls Shoal has a depth of 9 feet about 4 miles southwestward of Cape May Light. The 30-foot curve extends 3 miles farther in the general direction of Cape Henlopen and has a depth of 16 feet just inside its outermost limit.

McCrie Shoal, 7 miles southeast of Cape May Light, has a least charted depth of 18 feet; a lighted whistle buoy is on the southeast side of the shoal.

In March 1985, a sunken wreck, covered 6 feet, was reported on the southwest side of McCrie Shoal in about 38°50'47"N., 74°54'02"W.

Five Fathom Bank has a least charted depth of 17 feet about 15 miles eastward of Cape May Light. The area, inclosed by the 30-foot curve, is about 9 miles long, north to south, and about 2 miles wide. The greater part of Five Fathom Bank is within authorized fishtrap limits. Several buoys are moored around the bank.

Five Fathom Bank Lighted Horn Buoy F (38°47.3'N., 74°34.6'W.), replacing Five Fathom Bank Lightship, is a large navigational buoy (LNB) about 20 miles east-southeast of Cape May Light. The buoy is painted red, shows a


CAPE MAY, NEW JERSEY
CAPE MAY CANAL
DELAWARE BAY
CAPE MAY POINT
CAPE
MAY
LIGHT
CAPE MAY CHANNEL
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1976

flashing red light 36 feet above the water, and is equipped with a fog signal, a radiobeacon, and a racon.

Cape Henlopen (see also chart 12216), on the southwest side of the entrance to Delaware Bay, is marked by a number of towers and buildings. About 0.5 mile southward from the tip of the cape is a visual **reporting station** and radio control point for the Philadelphia Maritime Exchange. **Cape Henlopen Radiobeacon** (38°46.6'N., 75°05.3'W.) is about 1.7 miles south of the tip of the cape.

Cape Henlopen is building out from the northeastward to the northwestward; mariners are advised to exercise extreme caution in this area.

A **naval restricted area** extends northeastward from Cape Henlopen to Overfalls Shoal. (See **334.110**, chapter 2, for limits and regulations.)

Hen and Chickens Shoal extends southeastward from the tip of Cape Henlopen. The shoal has depths of 5 feet 1.3 miles from the tip of the cape and 12 feet 1.7 miles farther to the southeastward. The northeast side of the shoal is marked by buoys.

The Cape May-Lewes Ferry crosses the main channel in Delaware Bay about 4 miles northward of Cape Henlopen.

Delaware Lighted Horn Buoy D (38°27.3'N., 74°41.8'W.), is a large navigational buoy (LNB) about 28 miles southeastward of Cape Henlopen. The buoy is painted red, shows a light 36 feet above the water, and is equipped with a fog signal, radiobeacon, and a racon.

A **Traffic Separation Scheme (Delaware Bay)** has been established off the entrance to Delaware Bay. (See chart 12214.)

The scheme is composed basically of **directed traffic areas** each with one way inbound and outbound **traffic lanes** separated by defined **separation zones; a precautionary area;** and a **pilot boat cruising area.** The scheme is recommended for use by vessels approaching or departing Delaware Bay, but is not necessarily intended for tugs, tows, or other small vessels which traditionally operate outside of the primary traffic lanes or close inshore.

The Traffic Separation Scheme has been designed to aid in the prevention of collisions at the approaches to major harbors, but is not intended in any way to supersede or alter the applicable Navigation Rules. Separation zones are intended to separate inbound and outbound traffic lanes and to be free of ship traffic, and should not be used except for crossing purposes. Mariners should use extreme caution when crossing traffic lanes and separation zones. (See Traffic Separation Schemes, chapter 1, for additional information.)

The **precautionary area** for Delaware Bay entrance is inscribed by part of a circle with a radius of 8 miles centered on Harbor of Refuge Light (38°48.9'N., 75°05.6' W.) and extending from off Cape May Point to the shore south of Cape Henlopen with the traffic lanes fanning out from the circumference of the circle. The outer part of the northeast quadrant of the area is full of shoals, and there are shoal spots covered from 28 to 30 feet in the western extension of the Five Fathom Bank-Cape Henlopen Traffic Lane, about 2 miles west-northwestward of Delaware Bay North Approach Lighted Buoy 4. A charted wreck, about 1.2 miles north of Lighted Whistle Buoy FB, is just inside the precautionary area near the western extension of the Five Fathom Bank-Cape Henlopen Traffic Lane. In the southeast quadrant, the eastern limit of Hen and Chickens Shoal is marked by Lighted Whistle Buoy 1HC and a red sector in Harbor of Refuge Light. The usable part of the precautionary area has depths of 30 to over 100 feet. Since the precautionary area is used by both incoming and outgoing vessels, making the transition between Delaware Bay and the traffic lanes, extreme care is advised in navigating within the area.

The **pilot boat** cruising area is about a 1 mile northeastward of Cape Henlopen. (See pilotage later in this chapter.)

Eastern Directed Traffic Area:

Five Fathom Bank to Cape Henlopen Traffic Lane, Inbound.–The eastward approach to Delaware Bay is north of Five Fathom Bank Lighted Horn Buoy F (38°47.3'N., 74°34.6' W.) in Five Fathom Bank-Cape Henlopen Traffic Lane that tapers from 2 miles to 1 mile wide in its 16.4-mile length. By entering the traffic lane 1.5 miles north of Five Fathom Bank Lighted Horn Buoy F, a course of **268°** follows the centerline of the traffic lane to the precautionary area, thence west-southwesterly courses for about 5 miles passing southward of Delaware Bay North Approach Lighted Buoy 4, thence a northwesterly course leading to the pilot cruising area. Depths in the traffic lane vary from 37 feet or more in the eastern part to a reported 34 feet at the west end. Shoal spots covered 28 to 30 feet are in the western extension of the lane inside the precautionary area, about 2 miles west-northwestward of Delaware Bay North Approach Lighted Buoy 4. Avoid the charted wreck 2.9 miles west-northwestward of Five Fathom Bank Lighted Horn Buoy F, and the charted wreck, about 1.2 miles north of Lighted Whistle Buoy FB, just inside the precautionary area near the western extension of the lane.

Cape Henlopen to Five Fathom Bank Traffic Lane, Outbound.–The eastward exit by outbound vessels is south of Five Fathom Bank Traffic Lane Lighted Whistle Buoy FB (38°47.3'N., 74°55.5' W.) through Cape Henlopen-Five Fathom Bank Traffic Lane that expands from 1 mile to 2 miles wide. By entering the traffic lane 1 mile southward of Lighted Whistle Buoy FB, a course of **091½°** follows the centerline of the outbound traffic lane. When seaward of Five Fathom Bank Lighted Horn Buoy F steer usual courses to destination. Depths in the traffic lane are 40 feet or more.

Separation Zone.–The eastern separation zone between the inbound and outbound traffic lanes is 1 mile wide centered on a line through Five Fathom Bank Lighted Horn Buoy F, and two lighted whistle buoys 7.5 and 16.4 miles, respectively, westward from the Five Fathom Bank Lighted Horn Buoy F.

Southeastern Directed Traffic Area:

Delaware to Cape Henlopen Traffic Lane, Inbound.– The southeastward approach to Delaware Bay is north of Delaware Lighted Horn Buoy D (38°27.3'N., 74°41.8'W.) in Delaware-Cape Henlopen Traffic Lane that tapers from 2 miles to 1 mile wide in its 21-mile length. By entering the traffic lane 1.5 miles northeastward of Delaware Lighted Horn Buoy D, a course of **322°** follows the centerline of the traffic lane to the precautionary area, thence a northwesterly course for an additional 6 miles leads to the pilot cruising area. Depths in the traffic lane are 58 feet or more.

In March 1985, a sunken wreck was reported about 3.4 miles northwest of Delaware Lighted Horn Buoy D in about 38°30'13"N., 74°43'48"W.

Cape Henlopen to Delaware Traffic Lane, Outbound.–The southeastward exit by outbound vessels is southwestward of Delaware Traffic Lane Lighted Whistle Buoy DC (38°43.8'N., 74°57.6'W.) through Cape Henlopen-Delaware Traffic Lane that expands from 1 mile to 2 miles wide. By entering the traffic lane 1 mile southwestward of Lighted Whistle Buoy DC, a course of **145°** follows the centerline of the outbound traffic lane. When seaward of Delaware Lighted Horn Buoy D, steer usual courses to destination. Depths in the traffic lane are 51 feet or more.

Separation Zone.–The southeastern separation zone be-

tween the inbound and outbound traffic lanes is 1 mile wide centered on a line through Delaware Lighted Horn Buoy D and three lighted whistle buoys 6.8, 13.6, and 20.7 miles, respectively, on a bearing of 323° from Delaware Lighted Horn Buoy D.

A **Regulated Navigation Area** has been established in Delaware Bay and River. (See **165.1 through 165.13, and 165.303,** chapter 2, for limits and regulations.)

Channels.–Delaware Bay is shallow along its northeastern and southwestern sides, and there are extensive shoal areas close to the main channel. The bay has natural depths of 50 feet or more for a distance of 5 miles above the Capes; thence Federal project depths of 40 feet to the upper end of Newbold Island, 110 miles above the Capes, thence 25 feet to the Trenton Marine Terminal, 115 miles above the Capes, and thence 12 feet to the railroad bridge at Trenton. (See Notice to Mariners and latest editions of the charts for controlling depths.)

In May 1983, an obstruction, covered 38 feet, was on the east side of the channel about 0.8 mile east of Fourteen Foot Bank Light in about 39°02.9′N., 75°09.9′W.

Anchorages.–Deep-draft vessels sometimes anchor in various places along the dredged channel through the lower bay, but usually continue to more sheltered areas in the upper bay and river. General, explosives, quarantine, and naval anchorages are in Delaware Bay and Delaware River. (See **110.1 and 110.157,** chapter 2, for limits and regulations.)

Mariners are warned that submarine cables are in the north corner of the anchorage on the northeast side of New Castle Range. Furthermore, submerged pipelines are in the southwest part of the anchorage on the southeast side of Marcus Hook Range and in the middle of the anchorage southeast of Mifflin Range.

In December 1983, shoaling to 34 feet was reported in the northeast corner of the anchorage off Mispillion River in about 39°01′12″N., 75°13′42″W.

In bad weather tows and small craft sometimes anchor behind the breakwaters north and west of Cape Henlopen.

Tides.–The mean range of tide is 4.2 feet in Breakwater Harbor, 5.5 feet at Reedy Point, 5.6 feet at Marcus Hook, 5.9 feet at Philadelphia, and 6.8 feet at Trenton. (See the Tide Tables for daily predictions for Breakwater Harbor, Reedy Point, and Philadelphia.)

Currents.–The current velocity is 1.8 knots in Delaware Bay entrance. (See the Tidal Current Tables for daily predictions.) The tables also list current differences and other constants for about 55 other places in Delaware Bay and River.

The Tidal Current Charts, Delaware Bay and River, present a comprehensive view of the tidal-current movement in the bay and river, and provide a means of readily determining the direction and velocity of the current at various places throughout the waterway. The charts may be used for any year and are referred to daily predictions for Delaware Bay Entrance.

Weather.–Strong northwesterlies are prevalent from November through March; gales are encountered about 1 to 3 percent of the time. Seas build to 10 feet or more about 1 percent of the time from November through March. High seas are most likely with northwest or southeast winds. Average seas run 3 feet from October through March. During the summer, prevailing southerlies are often reinforced by the sea breeze and afternoon windspeeds may reach 15 to 25 knots. Strong easterly or southeasterly winds sometimes cause high tides in the Delaware Bay and River, resulting in the flooding of lowlands and damage to bay and river front properties.

Visibility is generally good although sometimes hampered by fog, precipitation, smoke, and haze. During the spring and early summer advection fog is carried into the bay on east and southeast winds; they can occur when a front stalls to the south or the Bermuda High is displaced northward. These fogs can be tenacious; they often lift somewhat during the day, particularly near the shore. Visibilities are worst from December through June. Fog is most frequent during April, May, and June when visibilities drop below 0.2 mile and about 3 percent of the time. Visibility of 2 miles or less is most likely in January and February due to the greater frequency of precipitation, particularly snow. Fog is less likely in July, August, and September.

Ice.–In ordinary winters there is usually sufficient ice in Delaware Bay and River to be of some concern to navigation. Thin ice has been known to form early in December between Chester and Philadelphia, but the heavier ice usually does not begin to run before January. The tidal currents keep the ice in motion, except where it packs in the narrower parts of the river; tugs and larger vessels from Philadelphia keep these parts of the river open. The ice usually packs heavier than elsewhere at Ship John Shoal, at Pea Patch Island, at Deepwater Point, and below Gloucester City. Ice is rarely encountered after the early part of March.

In severe winters, navigation has occasionally been interrupted above Chester, but the powerful vessels employed in the foreign and coasting trade keep the channel fairly open. The greatest danger is to wooden vessels, which are liable to be cut through on the waterline if they encounter thin ice.

Freshets.–Freshets are of rare occurrence, except in the vicinity of Trenton, and do not interfere with navigation unless accompanied by ice. Freshets and ice above Philadelphia are discussed further in the latter part of this chapter.

Pilotage on Delaware Bay and Delaware River is compulsory for all foreign vessels and U.S. vessels under register in the foreign trade. Pilotage is optional for U.S. vessels in the coastwise trade that have on board a pilot licensed by the Federal Government for these waters.

Pilot services are provided on a 24-hour basis by the Pilots' Association for the Bay and River Delaware, Chesapeake and Interstate Pilots Association (Federal Pilots), and Interport Pilots Agency, Inc. (Federal Pilots).

The Pilots' Association for the Bay and River Delaware maintains a pilot station at Cape Henlopen and an office (telephone, 215-922-7165; cable, DEL PILOTS) in Philadelphia. Pilots are generally arranged for in advance through ships' agents and board incoming vessels from the pilot boat in the pilot cruising area off Cape Henlopen. Pilots normally require an advance notice of 8 hours prior to vessel's arrival off Cape Henlopen. Inbound vessels are requested to contact the pilot station again at least 1 hour prior to arrival.

The pilot boats are 50 feet long with black hulls, and white houses with the word "PILOT" in large letters on each side. The pilot station and pilot boats may be contacted on VHF-FM channels 14 and 16. The pilots carry portable radiotelephones for bridge-to-bridge communications on VHF-FM channels 13.

The Pilots' Association for the Bay and River Delaware also provides qualified offshore "advisors" for the deepest draft vessels between Lighted Horn Buoy "D" and the anchorage areas in Delaware Bay. A notice of 24 hours before estimated arrival is requested for this service.

The Chesapeake and Interstate Pilots Association offers pilot services to U.S. vessels engaged in the coastwise trade and to public vessels between Cape Henlopen and any port

or place on the Delaware Bay and River, the Chesapeake and Delaware Canal, and the Chesapeake Bay and its tributaries. Arrangements for pilots are made through ships' agents or the pilot office in Norfolk (telephone, 804-855-2733; cable, CINPILOT). Pilots meet vessels in the pilot area off Cape Henlopen day or night from the pilot boat INTERPORT No. 1 which is blue with a white house with the word "PILOT" on the sides. At night, the standard pilot lights are displayed. A 12-hour estimated time of arrival (ETA) is requested with any change greater than 1 hour being advised to the pilots. The pilot boat INTERPORT No. 1 monitors VHF-FM channel 16 two hours prior to the vessels ETA and switches to VHF-FM channel 65A for working traffic.

The Interport Pilots Agency, Inc. offers pilotage to public and U.S. vessels in the coastwise trade transiting to Baltimore, the Chesapeake and Delaware Canal, Philadelphia, New York, Long Island Sound, Cape Cod Canal, and ports in the northeast. Arrangements for any of the above services are made in advance through ships' agents or with their office in Atlantic Highlands, N.J. (telephone 201-291-1310; cable, PORTPILOTS). An updated 12 hour estimated time of arrival (ETA) is requested.

Their 40-foot pilot boat RANGER, with a black hull and white house, meets vessels in the pilot area off Cape Henlopen. The RANGER monitors VHF-FM channel 16 2 hours prior to ETA, and uses VHF-FM channels 7 and 14 as working frequencies. Vessels are requested to provide a lee for the pilot boat, maintain about 5 knots, and rig a pilot ladder about 3 feet above the water.

The Chesapeake and Interstate Pilots Association's pilot boat CHESAPEAKE is also used by Interport Pilots Agency, Inc. (For description of the CHESAPEAKE, see Pilotage, chapter 9.)

Reporting stations.–The Philadelphia Maritime Exchange operates a central port operation and ship reporting service for the Port of Philadelphia, utilizing VHF–FM radio and visual reporting stations.

The Exchange's Port Radio, KEW–845, is operated on a 24-hour basis from the following control points: Marcus Hook Reporting Station, 0600 to 1800 hours; Cape Henlopen Reporting Station, 1800 to 0600 hours. The visual reporting station is at Cape Henlopen.

Information as to position, estimated time of arrival, docking, or other port operations, can be transmitted to or from ships on VHF channel 14. The control points also monitor VHF channel 16.

To obtain the maximum benefits of this service, ships are requested to monitor VHF channels 14 and 16 while transiting Delaware Bay and River.

Towage.–A large fleet of tugs operating out of Philadelphia is available at any time of the day or night for any type service required. Most of the tugboat companies will dispatch their vessels to any place in Delaware Bay or its tributaries. Some of the companies also have tugs available for deep-sea towing.

Quarantine, customs, immigration, and agricultrual quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) Vessels subject to boarding for quarantine inspection and destined to points above Marcus Hook are required to anchor off the Marcus Hook boarding station. Detention cases are taken to Philadelphia General Hospital. (See **110.157 (a)(8), and (b)**, chapter 2, for quarantine anchorage regulations and limits.)

Philadelphia is a **customs port of entry.**

Coast Guard.–The office of the **Captain of the Port** is at the Coast Guard Base, Gloucester City, N.J. A vessel documentation office is in Philadelphia, Pa.

Supplies.–Bunker oil is available in quantity at Philadelphia and at several other places. Most large vessels are bunkered from barges alongside. Freshwater is unlimited in the larger ports. Small craft can obtain fuel and supplies not only in the larger ports, but at many of the smaller cities and towns along the river and bay.

Repairs.–The largest shipyard along Delaware River is at Chester. Many of the other cities and towns have boatyards for small craft.

Chart 12216–Delaware Breakwater is the popular name for the anchorage areas behind the outer and inner breakwaters north and west of Cape Henlopen. Harbor of Refuge is the outer and deeper of the two areas; Breakwater Harbor is the inner area.

Harbor of Refuge is behind the breakwater that begins 0.7 mile north of Cape Henlopen and extends 1.3 miles in a north-northwestward direction. A line of ice breakers, marked by lights at the outer ends, extends 0.4 mile in a west-southwest direction onto **The Shears** from a position 0.4 mile northwestward of the north end of the breakwater. **Harbor of Refuge Light,** (38°48.9'N., 75°05.6'W.), 72 feet above the water, is shown from a white conical tower on a cylindrical substructure near the south end of the breakwater; the station has a fog signal. A light marks the breakwater near its northern end.

The harbor has depths of 17 to 70 feet between the breakwater and a shoal ridge, 8 to 12 feet deep, 1 mile to the southwestward. The deepest water is behind the Harbor of Refuge Light. The entrance from southeastward is deep and clear, while that from northwestward across The Shears has depths of 10 feet or less. Harbor of Refuge affords good protection during easterly gales.

Breakwater Harbor, between the inner breakwater and the shore, is excellent for light-draft vessels in all weather except heavy northwesterly gales and even then affords considerable protection.

The inner breakwater begins 0.3 mile southwest of the tip of Cape Henlopen and extends 0.8 mile in a west-northwest direction. **Delaware Breakwater Light,** (38°47.8'N., 75°06.0'W.), 61 feet above the water, is shown from a brown conical tower on the east end of the breakwater. A light is shown from a skeleton tower on the west end of the breakwater. A dangerous sunken wreck, covered 15 feet, is about 0.3 mile 300° from this light.

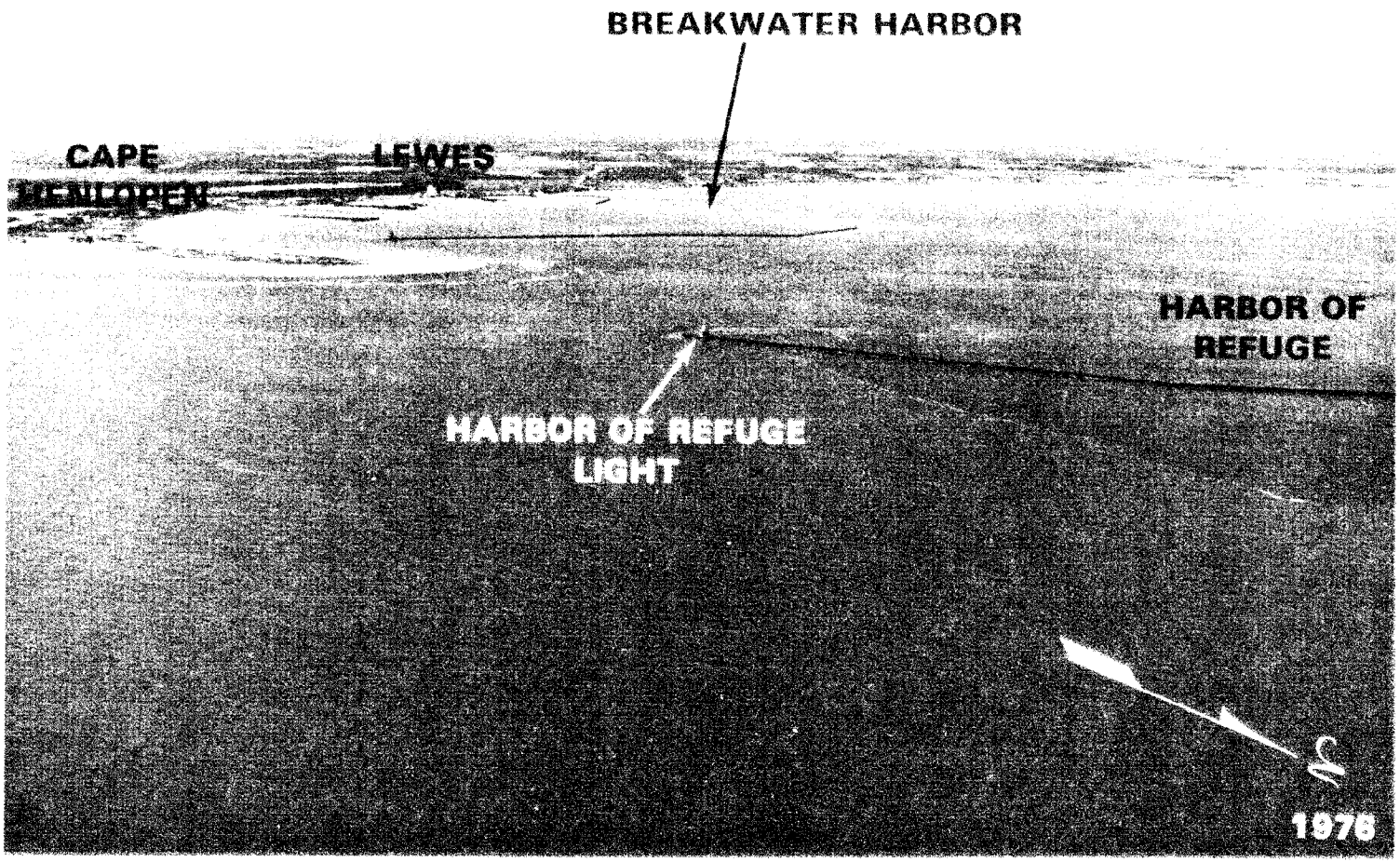
The Lewes terminal of the **Cape May-Lewes Ferry** is in the basin at the southwest end of Breakwater Harbor, 1.3 miles southwest of Delaware Breakwater Light. The basin is protected on its west side by a breakwater marked by a light.

Two dredged channels lead through Breakwater Harbor to the ferry basin; one leads from the northeastward along the southeast side of the harbor, and the other leads from the northward along the west side of the harbor. In September-October 1980, the channel leading from the northeastward, and the ferry basin, had controlling depths of 10 feet. In October 1980, the channel leading from the north had a controlling depth of 10 feet. Depths of 5 to 12 feet are reported in other parts of Breakwater Harbor. Cape Henlopen is steadily building out from the northeastward to the northwestward; mariners are advised to proceed with caution in this area.

A **naval restricted area** is in the eastern part of the harbor. (See **334.110**, chapter 2, for limits and regulations.)

Chart 12304.–The low, marshy southwestern shore of

CAPE HENLOPEN, DELAWARE



Delaware Bay has few prominent marks above Cape Henlopen. There are scattered groups of houses, a few observation towers, and the lights and ranges of the tributaries.

The tributaries are narrow and crooked, and vessels have difficulty making some of the turns. These streams are little used except by local fishing boats and by vessels carrying petroleum products to the towns along the banks. Strangers seldom attempt to enter. When entering or leaving these tributaries, allowance should be made for the bay currents which set across the entrances and have considerable velocity at times.

There are many shoal spots with depths as shallow as 2 to 6 feet between Cape Henlopen and Bombay Hook Point (39°18.7'N., 75°26.5'W.). Most of the spots are unmarked and are subject to some change, both in depth and position. In August 1980, shoaling to 5 feet was reported about 3.1 miles east of the entrance to Leipsic River in about 39°14.3'N., 75°20.3'W. Strangers should proceed with caution in any of the passages southwest of the ship channel.

Buoys mark a passage along the southwestern side of Delaware Bay from a point about 7.7 miles northwestward of Cape Henlopen and about 3 miles offshore to the entrance to Murderkill River. The many fish and oyster stakes in the area are to be avoided. A buoy marks a dangerous sunken wreck about 3.6 miles southeast of Murderkill River. The passage should not be attempted at night.

Vessels entering the southwestern passage from northward usually leave the main ship channel about 2.5 miles below Ship John Light and head in a southerly direction for the vicinity of the lighted buoy off Murderkill River. A depth of 7 feet can be carried through this passage, but care is necessary to avoid the 4-foot spot 2 miles off Little River.

Roosevelt Inlet (chart 12216), 3 miles west of Cape Henlopen, is described in chapter 8.

Mispillion River , protected at the entrance by jetties, empties from the westward into Delaware Bay 13 miles northwest of Cape Henlopen. The jetties, about 200 feet apart, extend about 1 mile southeastward from shore. The jetties are marked at the seaward ends by lights. The river is used by pleasure and fishing craft, and oil barges bound for Milford.

In February 1986, the controlling depth was 7 feet through the jetties, thence in 1981, a controlling depth of 3 feet was available to the State Route 14 bascule bridge just east of **Milford**, , thence the river channel shoals from 3 feet to 1 foot at Milford. In 1980, a bar was reported on the channel line about 100 yards southeast of the jetty lights. Mariners are advised to approach the channel from the northeast between the jetties and the bar; caution is advised.

The mean range of tide is 4.6 feet in the entrance. The current velocity is 1.5 knots on the flood and 1.0 knot on the ebb. In 1980, it was reported that current velocities up to 3 knots on the flood and 4 knots on the ebb may be encountered in the river. In 1968, an abnormal tidal cycle characterized by a long period at high water and a rapid change to low water, was observed at the entrance to Mispillion River. Occasional periods of lower than normal low water levels were also encountered.

Small-craft facilities just inside the mouth of Mispillion River, on Cedar Creek, and just above the fixed bridges about 1 mile below Milford, can provide gasoline, diesel fuel, and water. The oil terminal about 1 mile below Milford has about 5 feet alongside, and the wharves at Milford have 5 to 7 feet alongside; mud bottom.

An overhead power cable with a clearance of 53 feet crosses the river about 7 miles above the mouth. About 1.1 miles below Milford, the river is crossed by twin fixed highway bridges which have a clearance of 25 feet. About 0.5 mile below Milford, a highway bridge, with a 45-foot bascule span and a clearance of 5 feet, crosses the river. (See **117.1 through 117.59 and 117.241**, chapter 2, for drawbridge regulations.) An overhead power cable with a clearance of 45 feet is just southwest of the bascule bridge. A boatyard with a 25-ton mobile lift is just east of the bascule bridge. The fixed highway bridge at Milford is the head of navigation. A marine railway just below this bridge can haul out craft up to 55 feet for repairs.

A **danger zone** of a naval aircraft bombing area extends 2 miles offshore off **Milford Neck**, just north of the entrance to Mispillion River. (See **334.120**, chapter 2, for limits and regulations.)

Murderkill River, 21 miles northwestward of Cape Henlopen, is used by fishing vessels and a few pleasure craft. In October 1983, the centerline controlling depth was 3½ feet in the dredged entrance channel, thence in 1957, reported depths of 4½ feet to **Frederica**, about 6.5 miles above the mouth. A piling is in the approach just eastward of the entrance channel in about 39°03'48"N., 75°22'44"W. Another piling, which uncovers 3 feet, is on the northwest edge of the entrance channel in about 39°03'40"N., 75°23'22"W. The mean range of tide is 4.8 feet in the entrance.

A **247°** lighted range, a light, and buoys mark the entrance to Murderkill River.

Bowers Beach, a summer resort on the north side of the entrance to Murderkill River, is prominent from offshore. Gasoline and some marine supplies are available. The wharves along Murderkill River are used extensively by fishing and oyster boats. The overhead cables crossing the river at Bowers Beach have a clearance of 50 feet, and the overhead power cable crossing about 4.3 miles above the mouth has a clearance of 62 feet. The fixed highway bridge, 6 miles above the mouth, has a clearance of 12 feet.

St. Jones River, 0.5 mile north of Murderkill River, leads to the city of **Dover**, about 9.5 miles above the mouth, the capital of Delaware. In 1965, the controlling depths were less than a foot in the marked entrance channel, thence 4 feet to Lebanon, and about 3 feet to Dover. The mean range of tide is 4.8 feet in the entrance; the current velocity off the entrance is about 0.7 knot.

An overhead power cable with a clearance of 60 feet crosses the entrance to St. Jones River; another power cable, 2.4 miles above the mouth, has a clearance of 56 feet. The U.S. Route 113 highway bridge at **Barkers Landing**, 3 miles above the mouth, has a bascule span with a clearance of 5 feet. In February 1983, a fixed highway bridge with a design clearance of 24 feet was under construction immediately downstream of the bascule bridge at Barkers Landing; upon completion, it will replace the existing bascule bridge, which will be removed. A highway bridge at **Lebanon**, 6 miles above the mouth, has a swing span with a width of 29 feet and a clearance of 6 feet. The overhead power cable at the drawbridge has a clearance of 50 feet. (See **117.1 through 117.59 and 117.247**, chapter 2, for drawbridge regulations.) The fixed highway bridge 9 miles above the mouth has a clearance of 11 feet. There are no landings at Dover.

Little River (39°09.6'N., 75°24.5'W.) is 26 miles northwest of Cape Henlopen. A light marks the approach to the entrance. In 1974, the controlling depth was 2 feet in the entrance channel and 1½ feet to the fixed highway bridge at the town of **Little Creek**, 2 miles above the river mouth. An overhead power cable with a clearance of 52 feet crosses the river 0.2 mile below the fixed highway bridge.

Mahon River empties into Delaware Bay at **Port Mahon**,

27 miles northwest of Cape Henlopen. The river is used by commercial fishing boats, and small fuel barges. The controlling depth is about 8 feet in the privately marked entrance channel with deeper water inside. The Dover Air Force Base fuel pier, about 200 feet long with reported depths of 10 feet along the east side, is on the west side of the entrance. Some marine supplies can be obtained at the landing 0.4 mile above the mouth. A State-maintained boat launching facility with floating piers is on the west side of the river 0.8 mile above the mouth. The mean range of tide is 5.4 feet in the entrance.

Leipsic River, 30 miles northwestward of Cape Henlopen, is used occasionally by fishermen. In 1980, the reported depths were 5 feet in the entrance and deeper water inside to Leipsic, 7 miles above the mouth. The entrance is marked by a light. The mean range of tide is 5.5 feet in the entrance and 3.5 feet at Leipsic. The wharves at **Leipsic** have depths of 5 to 8 feet alongside. The fixed highway bridge at Leipsic has a clearance of 13 feet.

Smyrna River (39°22.0'N., 75°30.7'W.) (see also chart 12311), 39 miles northwest of Cape Henlopen, is navigable to **Smyrna Landing,** about 8 miles above the mouth and 1 mile from the town of **Smyrna.** In May 1971, the reported centerline controlling depth was 5 feet to Flemings Landing, thence in 1964, 3 feet to Smyrna Landing.

The entrance to the Smyrna River is protected by jetties. A buoy marks the outer end of the south jetty; ruins of the former south jetty light may be in the vicinity of the outer end of the jetty. In May 1983, it was reported that the south jetty had collapsed; caution is advised. Within the river, the best water generally follows a midchannel course or favors the ebbtide bends.

The current velocity is about 1.5 knots in the entrance to Smyrna River. State Route 9 highway bridge at **Flemings Landing,** 3 miles above the mouth, has a swing span with a width of 36 feet and a clearance of 5 feet. (See **117.1 through 117.59 and 117.245,** chapter 2, for drawbridge regulations.) This bridge is seldom opened as the river is little used above the bridge. Overhead power cables with a least clearance of 48 feet cross the river about 0.8 mile above the bridge.

Local magnetic disturbance.–Differences of as much as 5° from the normal variation have been observed near the mouth of Smyrna River.

The New Jersey side of Delaware Bay is low, with few prominent marks. The principal tributaries are Maurice and Cohansey Rivers, which can be used as harbors of refuge by small boats going between Cape May Canal and the Chesapeake and Delaware Canal; there are also many small creeks used mostly by fishing boats. General depths along this side of the bay are 7 to 15 feet, but there are many spots with depths of less than 6 feet. The shoals generally are not marked, and some local knowledge is needed to avoid them. Most of the creeks have bars across their mouths.

The channels have strong currents, and many tide rips form near Prissy Wicks Shoal. In unmarked Cape May Channel, the current velocity is 1.5 knots on the flood and 2.3 knots on the ebb. In the channel immediately northwestward of Overfalls Shoal, the velocity is 2 knots on the flood and 1.9 knots on the ebb.

Cape May Canal, 2 miles northward of Cape May Light, is described in chapter 5 in connection with the Intracoastal Waterway. Farther north are several creeks. The first of any importance to navigation is **Bidwell Creek** (39°07.7'N., 74°53.4'W.), a drainage canal 12 miles north-northeastward of Cape May Light; a private lighted buoy is off the entrance. In 1980, the controlling depth in the jettied entrance was reported to be about 1 foot. Strong currents may be encountered at and inside the entrance jetties, and entry at night during bad weather is extremely hazardous.

Deadman Shoal, 9 miles north-northwestward of Cape May Light, has a minimum depth of 5 feet. The shoal is marked by a lighted buoy. A ridge with depths of 5 to 7 feet begins a mile westward of Deadman Shoal and extends southward for about 3 miles.

Dennis Creek, 14 miles north-northeastward of Cape May Light, has depths of about 2 feet over the flats at the mouth and much deeper water inside to **Jakes Landing,** about 3 miles upstream. The creek is navigable for a considerable distance, but has no commerce and is little used.

Maurice River flows into the northeast corner of **Maurice River Cove** 17 miles north-northwestward of Cape May Light. **East Point,** on the east side of the entrance, is marked by a light. Large shellfish plants are along the lower part of the river; shipbuilding facilities are at Dorchester.

Maurice River is entered through a partially-dredged crooked channel that passes east of **Fowler Island,** which is in about the middle of the river's mouth. The northernmost section passing east of the island has natural depths.

When approaching Maurice River, mariners should use care and not confuse the structure of East Point Light with a private house with a tower about 1.3 miles to the east; both landmarks are similar in appearance.

In December 1985, the controlling depth was 5 feet in the entrance channel, thence 5 feet on the centerline to Mauricetown, and in 1967, 6 feet to Millville. The entrance channel is marked by lighted and unlighted buoys. The river channel above Mauricetown to Millville is marked by seasonal buoys.

For about 15 miles above the mouth of Maurice River, the channel is easily followed, but a sharp lookout is necessary to avoid stakes and dolphins extending into the river, many of which are broken off and covered at high water. Without local knowledge, it is safer to navigate this part of the river on a rising tide and proceed with caution. The upper part is narrow, but not difficult to navigate when the buoys are on station.

The mean range of tide is 5.7 feet in the entrance to Maurice River and 6 feet at Millville. The current velocity is about 1 knot in the entrance and about 2.3 knots at Mauricetown; at Millville, the flood is very weak and the ebb velocity is 0.4 knot. Owing to dereliction of the dikes along the river, greater current velocities have been reported; extreme care is required in docking.

Ice may be encountered on Maurice River from the latter part of December through the early part of March.

The shellfish industry is concentrated along the lower part of Maurice River with plants at the towns of **Bivalve, Port Norris,** and **Shell Pile,** about 3 miles above the mouth. The wharves have depths greater than 7 feet alongside. Gasoline is available.

A marina on the west side of the river about 3.5 miles above the mouth has berthing with water and electricity, a 20-foot boat ramp, gasoline, diesel fuel, ice, and marine supplies. Hull and engine repairs can be made. A 50-foot marine railway and a 12-ton mobile hoist are available.

There is a small-craft facility at Bivalve, on the east side of the river about 3 miles above the mouth, and several other facilities on the east side of the river from about 4.5 miles to 6 miles above the mouth. Most of these facilities can provide gasoline, diesel fuel, berths, and marine supplies.

The shipyard at **Dorchester,** 9 miles above the mouth of Maurice River, has a 165-foot railway. A marina at Dorchester has gasoline, slips, a 60-foot marine railway, and

a 20-ton mobile hoist. Hull and engine repairs can be made at all of the facilities.

At **Mauricetown,** 10 miles above the mouth of Maurice River, a vertical lift bridge with a clearance of 25 feet is maintained in the closed position. (See **117.731,** chapter 2, for drawbridge regulations.) The overhead power cable 300 yards southward has a clearance of 60 feet.

Port Elizabeth is 1 mile up **Manumuskin River** and about 12 miles above the mouth of Maurice River. About 1.5 miles above Port Elizabeth on Maurice River is a boatyard with a 40-foot marine railway; hull and engine repairs can be made.

Millville, 20 miles above the mouth of Maurice River, has several factories but no municipal docks. An overhead power cable about 1 mile south of Millville has a clearance of 67 feet. The fixed highway bridge at Millville has a clearance of 4 feet, and is the head of navigation.

Egg Island Point (39°10.8′N., 75°08.2′W.), 17 miles north-northwest of Cape May Light, is marked by a light. Southward of the point are **Egg Island Flats,** which have depths as little as 3 feet. The flats are thick with oyster-bed stakes. Between Egg Island Point and the inner end of the flats is a slough, with depths of 7 feet, used by local boats.

Fortescue Creek, 4 miles north-northwestward of Egg Island Point, has a directional light at the south side of the entrance. The entrance channel is marked by buoys and the directional light at the mouth of the creek. In 1980, the reported controlling depth was 4 feet over the bar at the mouth of the creek; thence in 1977, a controlling depth of 9 feet was on the centerline of the creek to the highway bridge at **Fortescue,** a small summer settlement on the south side 0.4 mile above the entrance. Gasoline, diesel fuel, and some supplies can be obtained. Near the bridge are two marine railways that can haul out boats up to 45 feet.

Nantuxent Point, 8 miles northwestward of Egg Island Point, is on the southeast side of the entrance to **Nantuxent Cove.** A lighted buoy marks the outer limit of the 5-and 6-foot spots that extend over a mile offshore from the point.

Nantuxent Creek, on the north side of Nantuxent Point, has depths of about 5 feet in the mouth and is navigated at high water by local fishing boats for about 5 miles to within 1 mile of the village of **Newport.** A small-craft facility is at **Money Island,** a town about 1.2 miles above the mouth. Gasoline, berths, and limited marine supplies are available here.

Back Creek, 27 miles northwest of Cape May Light and 2 miles northwestward of Nantuxent Point, is used by local boats as an anchorage. The entrance is marked by a private lighted buoy. The creek has depths of about 5 feet over the flats at the entrance and good depths for several miles above; however, local knowledge is advised. Berths, gasoline, and marine supplies are available at a landing 5 miles above the mouth. Hull and engine repairs can be made; lift, 6 tons.

Ben Davis Point is on the northwest side of the entrance to Nantuxent Cove. It is marked by a light. Shoals to be avoided are the rock awash about 1.2 miles southwestward of the point and 5-foot **Ben Davis Point Shoal,** which is 2.5 miles south-southwest of the point and within 0.7 mile of the main channel through the bay.

Cohansey River, which empties into the northeast side of Delaware Bay 31 miles northwestward of Cape May Light, is used mostly by pleasure craft, although some petroleum is transported to Bridgeton. **Cohansey Light** (39°20.5′N., 75°21.7′W.), 42 feet above the water, is shown from a black skeleton tower with a white daymark on the south side near the natural entrance. A dredged cut through the narrow neck of land on which the light stands gives a more direct approach to the river; the cut, 0.3 mile northwest of Cohansey Light, is marked on its west side by lights at the inner and outer ends. The river is unmarked above the dredged cut. In 1976, the controlling depths were 6½ feet in the entrance channel; thence 3½ feet to the south end of Bridgeton, about 16.7 miles above the mouth; thence in 1959–1976, 2½ feet to about 200 yards above the bascule bridge at Bridgeton. In June 1982, a submerged obstruction was reported about 25 yards 145° from Cohansey Outer Light 1; caution is advised.

The usual approach to Cohansey River is along the axis of the dredged cut, but the natural channel eastward of Cohansey Light is sometimes used; the latter has a controlling depth of about 7 feet, and unmarked shoals with depths of 4 to 6 feet must be avoided on either side. Within the river, the natural channel has ample width and depth to within a mile of Bridgeton; thence to Bridgeton is a dredged channel which requires some local knowledge to follow.

The mean range of tide is 6.0 feet in the entrance and 6.5 feet at Bridgeton; high water at Bridgeton is about 2 hours later than at the entrance. The current velocity is about 1.3 knots half a mile above the entrance and less than 0.5 knot at Bridgeton.

There are small-craft facilities near **Greenwich Pier,** 4 miles above the mouth, and at **Fairton,** 14 miles above the mouth. Gasoline, diesel fuel, berths, and marine supplies are available; hull and engine repairs can be made. Maximum haul-out capacities are: marine railway, 35 feet; mobile hoist, 30 tons.

Bridgeton, about 17 miles above the mouth, is an important manufacturing town and rail center, but has no municipal piers or marinas. Broad Street bridge at Bridgeton has a 40-foot bascule span and a clearance of 6 feet, but is kept in a closed position. (See **117.711,** chapter 2, for drawbridge regulations.) The overhead power cable 0.2 mile below the bridge has a clearance of 44 feet.

Chart 12311.–Bay Side (39°22.8′N., 75°24.2′W.) is a fishing resort on the east side of the entrance to **Stow Creek.** The creek has very little traffic.

The dividing line between **Delaware River** and Delaware Bay is 42 miles above the Delaware Capes. The line, defined arbitrarily by the legislatures of Delaware and New Jersey, extends from a monument on **Liston Point,** Del., to a similar monument on the south side of the entrance to **Hope Creek,** N.J.

In 1967, the monument on Liston Point was reported destroyed; and in 1983, the monument on the south side of the entrance to Hope Creek was also reported destroyed. Remains of the structure from Liston Point may exist up to 100 feet offshore and may be covered during high tide.

Bridges.–For regulations affecting drawbridges crossing the Delaware River see **117.1 through 117.59, 117.716, and 117.904,** chapter 2.

Artificial Island, Mile 44E, is the name given to the peninsula formed by the filled area covering most of **Baker Shoal.** The domes of the Salem Nuclear Power Plant, at the south end of the island, are prominent from upstream and downstream. An unmarked channel leads to a basin south of the powerplant. In 1980, 18 feet was reported in the channel and basin.

Local magnetic disturbance.–Differences of as much as 2° to 5° from normal variation have been observed along the channel from Artificial Island to Marcus Hook.

Alloway Creek, Mile 47.5E, has a controlling depth of about 3 feet to Quinton. The approach to Alloway Creek is unmarked. The shoals on either side of the mouth must be avoided. Above the mouth, the best water is not always in midstream, and some local knowledge is needed to find it.

The current velocity is 2.1 knots 0.2 mile above the entrance and about 1.4 knots at New Bridge. An overhead power cable crossing the creek about 0.8 mile above the mouth has a clearance of 80 feet.

The Mill Street highway bridge at **Hancocks Bridge,** 4 miles above the mouth of Alloway Creek, has a swing span with a width of 40 feet at the north draw and a clearance of 4 feet. An overhead power cable on the west side of the bridge has a clearance of 50 feet. Salem County Bridge at **New Bridge,** 5.5 miles above the mouth, has a swing span with a width of 35 feet and a clearance of 3 feet. The State Route 49 highway bridge at **Quinton,** 8 miles above the mouth, has a swing span with a width of 30 feet and a clearance of 3 feet. The bridge is maintained in the closed position. (See **117.1 through 117.59 and 117.701,** chapter 2, for drawbridge regulations.) An overhead power cable on the west side of this bridge has a clearance of 50 feet.

Salem River is entered through **Salem Cove** at Mile 50E, across the Delaware River from the entrance to the Chesapeake and Delaware Canal. Traffic on Salem River consists principally of pleasure craft. The approach channel follows the southeast side of Salem Cove for about 2 miles to the mouth of the river; it is marked by buoys and a lighted **027°20′** range. Within the river, the channel enters a land cut 0.8 mile above the mouth and returns to the river 1.3 miles from the mouth; the river channel is marked by buoys as far as the cut. In August 1984, the controlling depth across Salem Cove was 12 feet. In 1976 the controlling depth through the cut-off channel was 3½ feet to the bascule bridge at Salem. Above this point, the depths are 2 feet or less.

The mean range of tide is 5.6 feet at Salem; the tides at Salem are about 35 minutes later than at Reedy Island. The current velocity is about 1.6 knots in the entrance. The maximum expected current in the land cut is 3 knots.

State Route 49 highway bridge, 1.8 miles above the mouth, has a bascule span with a clearance of 5 feet. (See **117.1 through 117.59 and 117.749,** chapter 2, for drawbridge regulations.) Overhead power cables above and below the bridge have a least clearance of 50 feet.

Several marinas and boatyards are along the north bend of Salem River and at Salem; slips, gasoline, and some marine supplies are available; hull and engine repairs can be made. Mobile lifts up to 15 tons are available along Salem River.

Appoquinimink River (39°26.9′N., 75°34.7′W.), Mile 44W, has no commerce and is little used except by pleasure craft and a few fishing boats. Controlling depth to Odessa is about 2 feet. The current velocity in the entrance is about 1.1 knots. The fixed highway bridge, 3 miles above the mouth, has a width of 37 feet and a clearance of 6 feet. The fixed highway bridge at **Odessa,** 5.5 miles above the mouth, has a width of 38 feet and a clearance of 4 feet. Overhead power cables across the river have a minimum clearance of 52 feet.

Reedy Island, Mile 48W, is the site of a former Federal quarantine and detention station. The pier on the channel side of the island has a depth of 10 feet at the outer end; the current velocity is about 2.5 knots off the pier. A submerged dike extends 3 miles southward from Reedy Island and roughly parallels the western shore; the dike is marked by lights, and unlighted seasonal warning buoys.

Port Penn is a village on the western shore opposite Reedy Island. The best approach to the village is through an opening in the Reedy Island dike; the opening, 0.2 mile south of the island, is 5 feet deep and 150 feet wide, and marked on each side by a daybeacon. Approaches to the village from north of Reedy Island or from south of the dike are over flats with depths of 2 feet. Anchorage depths off Port Penn are 15 feet or more, but in 1980, none of the landings at the village were usable.

The **Chesapeake and Delaware Canal,** Mile 51W, is described in chapter 7.

Pea Patch Island, Mile 53W, is the site of **Fort Delaware State Park.** The wharf, on the main channel, is marked by a light. In 1983, the wharf was in ruins. The area around the wharf is fouled with rocks which extend about 220 yards southwest along the shoreline of Pea Patch Island. A dike, mostly submerged at high water, extends northward along **Bulkhead Shoal** for about 3 miles from Pea Patch Island; the dike is marked by lights and daymarkers. The current velocity is 2.3 knots in the main channel east of the island. A ferry runs between Delaware City and Pea Patch Island on weekends, April through October.

Delaware City is on the southwest side of Delaware River opposite Pea Patch Island. **Delaware City Branch Channel** extends southward from the riverfront of the town to the Chesapeake and Delaware Canal. A buoy marks the Delaware River entrance to Delaware City Branch Channel. In August 1983, the controlling depth in the channel was 6 feet. Mariners are cautioned to stay well inside the north and south entrance channels. The entrance channel at the Delaware River end of the branch channel shoals rapidly along the sides. The entrance channel at the Chesapeake and Delaware Canal end of the branch channel was reported, in 1975, to have shoaled to bare on the east side; a submerged pile was reported on the west side of the channel. Depths alongside the Delaware City bulkhead were 6 feet to bare in April 1982.

A highway bascule bridge with a clearance of 6 feet crosses the channel about 0.6 mile above the entrance; the bridge is maintained in the closed position. An overhead power cable 500 feet north of the bridge has a clearance of 64 feet; overhead power and telephone cables just south of the bridge have a clearance of 30 feet.

Berths, gasoline, diesel fuel, ice, and some marine supplies are available on the west side of Delaware City Branch Channel at a marina 0.3 mile southwest of the northeast entrance. Hull and engine repairs can be made; a 25-ton mobile hoist is available.

A privately dredged cut with a reported controlling depth at midchannel of 34 feet in August 1982, marked by a private **306°** lighted range and private buoys, extends northwestward through **Bulkhead Shoal Channel** from Delaware River main channel to the Getty Oil Company terminal on the northwest side of Delaware City. The three offshore wharves at the terminal have a combined berthing area of 2,850 feet with dolphins. In May 1982, depths of 34 to 41 feet were reported alongside; deck height, 14 feet. The storage capacity at the terminal is 8 million barrels. Water is available on the wharves.

The current velocity is 2.1 knots between Pea Patch Island and Delaware City.

An overhead power cable with a clearance of 223 feet crosses the river about 1.5 miles above Fort Delaware Light (39°35.4′N., 75°33.9′W.). A private fog signal is sounded from the power cable support tower on the west side of the channel.

New Castle, Mile 57W, has little waterborne commerce. The principal public wharf was in ruins in 1983. Several stone fenders that stand about 5 feet above high water protect the wharves from drifting ice. A 40-foot marine railway, 0.4 mile north-northeast of the public wharf, can handle boats for emergency repairs at high water.

Pennsville, Mile 58E, has a small marina with an 8-ton mobile hoist; minor repairs can be made.

A submerged jetty, marked by seasonal buoys, is in **Travis Cove** at about Mile 58.7E.

Delaware Memorial Bridge, Mile 60, has twin suspension spans over the main channel with a clearance of 188 feet for the middle 800 feet.

Salem Canal, at the east end of the bridges, once gave access to the upper part of Salem River. The route is now blocked in several places, the first being at a dam about 300 yards above the mouth.

Deepwater Point, 0.6 mile above the New Jersey end of the Memorial Bridge, is the site of the E.I. duPont de Nemours and Co., Inc., Chambers Works. The 500-foot offshore wharf (39°41′37″N., 75°30′40″W.) at the plant can provide 600 feet of berthing space with dolphins. Depths of 32 feet are reported alongside; deck height is 10½ feet. Acids, other chemicals, and petroleum for plant consumption are handled at the wharf. A railroad car transfer bridge is immediately northward of the wharf.

Pigeon Point, Mile 60.5W, has a railroad car-float bridge. Railroad cars are barged to Deepwater Point and Thompson Point.

Christina River, Mile 61.5W, is the approach to the city of Wilmington and to the towns of Newport and Christiana.

Channels.–A Federal project provides for a 35-foot channel from Delaware River to Lobdell Canal and a turning basin of the same depth opposite the Wilmington Marine Terminal. The channel is subject to frequent shoaling. (See Notice to Mariners and the latest editions of the charts for controlling depths.) A steel sheet-pile jetty, 0.4 mile long and marked at its outer end by a light, is on the south side of the entrance. The channel is marked by a **293°** lighted range and by a lighted bell buoy on the north side of the entrance.

Above Lobdell Canal, the controlling centerline depths in Christina River, in 1960-May 1984, were 11 feet to a point 5 miles above the mouth, thence 5½ feet, via a cutoff channel 5.5 miles above the mouth, to the bascule bridge at Newport. Above this point local knowledge is necessary to carry the best water.

Port of Wilmington Marine Terminal, on the south side of Christina River 0.7 mile above the mouth, is owned by the city of Wilmington and operated by the city of Wilmington Department of Commerce, and Wilmington Launch Service, Inc. The 3,060-foot marginal wharf at the terminal and a 515-foot floating wharf close southwestward have reported depths of 35 feet alongside; deck height, 12 feet. The terminal has rail and highway connections, 46,400 square feet of covered storage, 90 acres of open storage, and water and electrical shore-power connections; cranes up to 100 tons, a bulk loader and unloader that can handle 500 tons per hour, and a 35-ton container crane are available. General, containerized, and roll-on/roll-off cargo, automobiles, wood products, and solid and liquid bulk products are handled at the terminal.

Port of Wilmington Marine Terminal Tanker Berth, on the north side of the south jetty 0.5 mile eastward of Wilmington Marine Terminal, is owned by the U. S. Government and operated by Sico Co., and Delaware Terminal Co., Inc. The wharf has a 50-foot face and can accommodate vessels up to 1,000 feet with dolphins. Depths of 34 feet are reported alongside; deck height, 12 feet. Petroleum products are handled at the berth.

Lobdell Canal, on the south side of Christina River 0.9 mile above the mouth, is not used.

Brandywine Creek, on the northeast side of Christina River 1.6 miles above the mouth, has depths of about 4 feet to the railroad bridge 1 mile above its mouth. The channel is rocky above the railroad bridge, but depths of 1 to 2 feet can be carried 0.7 mile to Market Street bridge, above which there are rapids. The river is used mostly for anchorage and storage of pleasure boats.

An overhead power cable about 0.1 mile above the mouth has a clearance of 59 feet.

The railroad bridge about 1 mile above the mouth of Brandywine Creek and the highway bridges above it have fixed spans with a minimum width of 40 feet and a clearance of 10 feet. The overhead power cable 300 yards above the railroad bridge has a clearance of 34 feet.

Wilmington, on the north side of Christina River 2.5 miles above the mouth, has large manufacturing interests. Both sides of the river at the city are lined with wharves which support a large traffic in barges. The deepwater facilities, which were described earlier, are on the south side of the river just inside the entrance. For a complete description of the port facilities at Wilmington refer to Port Series No. 8, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

Newport, on the north side 6.8 miles above the mouth, is at the head of practical navigation.

Anchorages.–Vessels must not anchor in Christina River channel within the city limits of Wilmington or tieup at any wharf more than two abreast without permission of the harbor commissioners. A general anchorage is off Deepwater Point, south of the river entrance. (See **110.1 and 110.157 (a)(7) and (b),** chapter 2, for limits and regulations, and page T–4 for **Wilmington climatological table.**)

Bridges.–There are no bridges or overhead power cables over the deepwater section of Christina River. From Lobdell Canal to just above the bridge at Newport, 6.8 miles above the mouth, the least clearance of drawbridges is 2 feet and fixed bridges, 22 feet. (See **117.1 through 117.59 and 117.237,** chapter 2, for drawbridge regulations.) The least clearance of overhead power cables is 42 feet. In 1975, a fixed highway bridge with a design clearance of 27 feet was under construction about 6.5 miles above the mouth.

In 1984, partially submerged concrete structures of a former bridge were reported about 4.9 miles above the mouth of the river near Interstate 95 fixed bridge; caution is advised.

Tides and currents.–The mean range of tide is 5.7 feet at Wilmington. The current velocity is about 0.8 knot.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) Vessels subject to boarding for quarantine inspection are required to anchor off Marcus Hook boarding station, 7 miles up the Delaware River from Wilmington.

Wilmington is a **customs port of entry.**

Harbor regulations.–The speed of vessels in Christina River is limited to 8 miles per hour. (See **162.35,** chapter 2.)

Supplies.–Water can be supplied at the Wilmington Marine Terminal from the city mains. The nearest facilities for supplying deep-draft vessels with bunker oil are at Marcus Hook. Light-draft vessels can obtain fuel at a wharf on the south side of Christina River just above the second bridge; the depth at the wharf is about 8 feet. Small craft can obtain gasoline and supplies at Wilmington near the second bridge over Christina River.

Repairs can be made to light-draft vessels and small craft at the boatyards near the second bridge on Christina River; largest marine railway, 110 feet. Small-craft repairs can also be made at a boatyard above the second bridge on Brandywine Creek.

Communications.–Wilmington is served by three rail-

roads. The principal airport is the Greater Wilmington Airport, 5 miles southwest of Wilmington; regular scheduled passenger service is maintained.

Chart 12312.–Carneys Point (39°42.9′N., 75°29.1′W.), Mile 61.8E, is across the Delaware River from Christina River.

Speed.–The Corps of Engineers has requested that masters limit the speed of their vessel when passing wharves and piers so as to avoid damage by suction or wave wash to property or persons.

Edgemoor is at Mile 63W. The wharves of the E.I. duPont de Nemours Co., Edgemoor Plant, have depths of 20 feet reported at their outer ends.

A dike with its outer end submerged extends 0.3 mile offshore from **Oldmans Point,** on the eastern shore of Delaware River 2 miles above Edgemoor. About 0.3 mile southward of the dike are the ruins of a long pier.

Local magnetic disturbance.–Differences of 2° to 5° from normal variation have been observed astride the Delaware River Channel from Oldmans Point to the mouth of Oldmans Creek.

Oldmans Creek, Mile 66E, has an unmarked channel leading from the Delaware River to the mouth of the creek. In 1973, extensive shoaling was reported at the entrance to and throughout Oldmans Creek. Mariners should exercise extreme caution when transiting this area. The mean range of tide is 5.6 feet at Oldmans Point.

A vertical-lift bridge and two swing bridges cross the creek between the mouth and **Pedricktown,** about 3.6 miles above the mouth; all are kept in a closed position. (See **117.737,** chapter 2, for drawbridge regulations.) The limiting clearance of the bridges is 1 foot at the second bridge, and the minimum width is 36 feet at the second bridge. In November 1979, the swing span of the second bridge was being replaced with a removable span. The design clearances of the new span are 3 feet vertical and 14 feet horizontal.

Marcus Hook, Mile 69N, is an important petroleum center where large quantities of crude oil are received and refined petroleum products are shipped. Vessels can be bunkered at the rate of 1,500 to 5,000 barrels per hour and the companies also operate barges for bunkering in the stream or alongside other wharves.

A Government wharf at Marcus Hook has a depth of 14 feet at the outer end.

A daytime **reporting station** of the Philadelphia Maritime Exchange is on the Sun Oil Wharf at the lower end of the city waterfront at 39°48′23″N., 75°25′10″W.

On the southeast side of the main ship channel opposite Marcus Hook is a **general anchorage** with a preferential area for vessels awaiting quarantine inspection. (See **110.1 and 110.157 (a) (8) and (b),** chapter 2, for limits and regulations.) The mean range of tide is 5.6 feet at Marcus Hook. The current velocity is about 1.7 knots.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Wharves.–There are deep-draft wharves and piers along the Delaware River at Marcus Hook, Pa., and adjacent Claymont, Del. All have direct highway and railroad connections and water and electrical shore power. The alongside depths are reported depths. (For information on the latest depths contact the operator.) Only deep-draft facilities are described. For a complete description of the port facilities refer to Port Series No. 8, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

Texaco Delaware River Terminal Pier (39°48′06″N., 75°26′00″W.): southwest side 898 feet long, 450 feet usable, 0 to 22 feet alongside; deck height, 14 feet; northeast side 905 feet long, 300 feet usable, 0 to 18 feet alongside; deck height, 14 feet; 835,000-barrel storage capacity; receipt and shipment of petroleum products, receipt of petrochemicals, bunkering vessels; owned and operated by Texaco, Inc.

Allied Chemical Co. Delaware Works, Upper Pier: 200 yards northeastward of Texaco Terminal; southwest side 744 feet long; 30 to 18 feet alongside; deck height, 12 feet; northeast side 747 feet long, 545 feet usable; 30 to 18 feet alongside; deck height, 12 feet; two travelling gantry cranes with unloading rate of 300 tons per hour; receipt and shipment of bulk and spent sulfuric acid, receipt of bauxite; owned and operated by Allied Chemical Co.

Sun Refining and Marketing, Marcus Hook Wharf 3C (39°48′23″N., 75°25′10″W.): face 120 feet long, 1,000 feet usable with dolphins; 37 feet alongside; deck height, 15 feet; 14¼-million-barrel storage capacity; receipt and shipment of petroleum products and petrochemicals, receipt of crude oil, bunkering vessels; owned and operated by Sun Refining and Marketing Co.

Sun Refining and Marketing, Marcus Hook Wharf 3A: northwestward of Sun Co. Wharf 3C; face 71 feet long, 1,000 feet usuable with dolphins; 37 feet alongside; northeast side 504 feet long, 500 feet usable; 37 to 12 feet alongside; deck height, 15 feet; receipt and shipment of petroleum products and petrochemicals, receipt of crude oil, bunkering vessels; owned and operated by Sun Refining and Marketing, Division of Sun Co. of Pennsylvania.

Sun Refining and Marketing, Marcus Hook Wharf 2: 250 yards northeastward of Wharf 3A; face 90 feet long, 650 feet usable with dolphins; southwest side 345 feet long, 300 feet usable; northeast side 500 feet long, 440 feet usable; 37 to 0 feet alongside; deck height, 15 feet; receipt and shipment of petroleum products, receipt of crude oil, shipment of petrochemicals, bunkering vessels; owned and operated by Sun Refining and Marketing, Division of Sun Co. of Pennsylvania.

Sun Refining and Marketing, Marcus Hook Wharf 1: 250 yards northeastward of Wharf 2; face 80 feet long, 600 feet usable with dolphins, 29 feet alongside; southwest side 500 feet long, 470 feet usable, 29 feet alongside; northeast side 470 feet long, 29 to 0 feet alongside; deck height, 15 feet; receipt and shipment of petroleum products, receipt of crude oil, bunkering vessels; owned and operated by Sun Refining and Marketing, Division of Sun Co. of Pennsylvania and Hays Tug and Launch Service, Inc.

BP Oil Marcus Hook Docks (39°48.8′N., 75°24.5′W.): two offshore wharves connected by catwalks provide 1,400 feet of berthing space with dolphins, 40 feet alongside; deck height, 10½ feet; storage capacity 5½ million barrels; receipt and shipment of petroleum products; receipt of crude oil, bunkering vessels; owned by Sohio Petroleum Co., Inc.; operated by BP Oil, Inc.

BP Oil Marcus Hook Barge Wharf: immediately northeastward of BP Oil Marcus Hook Docks; face 500 feet; 34 feet alongside; rear of face 480 feet; 20 feet alongside; deck height, 14 feet; receipt and shipment of petroleum products, receipt of crude oil; owned by Sohio Petroleum Co., Inc.; operated by BP Oil, Inc.

Opposite Marcus Hook, at Mile 69S, (39°48′05″N., 75°24′14″W.) is the Monsanto Plant offshore wharf with 1,000 feet of berthing space with dolphins; 28 feet alongside; deck height, 15 feet; receipt and shipment of liquid chemi-

cals; 190,000-barrel storage capacity; owned and operated by Monsanto Polymer Products Co.

Raccoon Creek, Mile 70S, is the approach to the towns of Bridgeport and Swedesboro. The creek carries some traffic in fertilizer and fertilizer materials. The approach to Raccoon Creek is a dredged channel that extends west-southwestward through the shallow flats for 1.1 miles from the mouth. In 1976–1977, the reported controlling depths were 4 feet in the entrance channel, thence 6½ feet on the centerline to Bridgeport, and thence 1½ feet on the centerline to Swedesboro.

The approach channel is marked by buoys, and a light marks the outer end of the rock jetty on the south side of the entrance.

The U.S. Route 130 highway bridge at **Bridgeport,** 1.5 miles above the mouth, has a vertical-lift span with clearance of 4 feet down and 64 feet up. The ConRail bridge, 0.3 mile above the highway bridge, has a swing span with a width of 38 feet and a clearance of 7 feet. (See **117.1 through 117.59 and 117.741,** chapter 2, for drawbridge regulations.) Gasoline and minor repairs are available at a small marina on the north bank 1 mile below the highway bridge.

Between Bridgeport and **Swedesboro,** 7.1 miles above the mouth, the least bridge clearances are: swing bridge, 50 feet horizontal, 6 feet vertical; fixed bridges, 33 feet horizontal, 8 feet vertical. Overhead power cables crossing the creek between the mouth and Swedesboro have a least clearance of 64 feet.

An overhead power cable across Delaware River at Mile 70.5, near the northeast end of Marcus Hook Range, has a clearance of 210 feet.

The **Commodore John Barry Bridge,** a fixed highway bridge with a clearance of 181 feet for a width of 1,600 feet over the main channel and 190 feet at the center, crosses the Delaware River between Chester and Bridgeport at Mile 71.

Chester, Mile 72N, is an important manufacturing center, and many of its industries use the wharf facilities along the 3-mile waterfront. The nearest designated anchorage is off Marcus Hook.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Chester is a **customs port of entry.**

Waterborne traffic to the wharves and piers in Chester consists mainly of barge traffic and light-draft vessels. The wharves have depths of 15 to 20 feet alongside; and some have as little as 5 feet. There are storage facilities and mechanical transfer equipment, and most have rail and highway connections. Water is piped to most facilities.

Complete repairs to large vessels can be made at the Pennsylvania Shipbuilding Co. at Chester (39°50.9′N., 75°20.7′W.). The largest floating drydock has an overall length of 712 feet, clear width of 197 feet, depth of 27 feet over the blocks, and a lifting capacity of 75,000 tons. Two 23½-ton cranes and an 800-ton floating crane are available.

Chester Creek empties into Delaware River about at the midpoint of the city waterfront. The railroad bridge just above the mouth has a swing span with a clearance of 1½ feet. (See **117.1 through 117.59 and 117.901,** chapter 2, for drawbridge regulations.)

Above that point, navigation is restricted by the 6-foot minimum clearance of the fixed bridges. The controlling depth is about 2 feet to the second bridge, 0.2 mile above the entrance. The mean range of tide is 5.7 feet in the entrance.

The current velocity is 1.7 knots on the flood and 2.2 knots on the ebb off **Eddystone,** Mile 73N.

Darby Creek, Mile 74N, was reported to be shoaled to an unknown extent in the entrance in August 1980. The railroad bridges, 0.3 mile above the mouth, have bascule spans with minimum clearances of 3 feet. (See **117.1 through 117.59 and 117.903,** chapter 2, for drawbridge regulations.) The fixed highway bridge just above the railroad bridges has a clearance of 22 feet. Another fixed highway bridge with a clearance of 22 feet is 0.6 mile above the mouth of Darby Creek. Parallel fixed highway bridges, 1.2 miles above the mouth, have a least clearance of 4 feet. Oil barges and small tankers go to the wharf with about 7 feet alongside just below the railroad bridges; above this point, the creek is used only by small pleasure craft. The overhead power cable, 3.7 miles above the mouth of the creek, has a clearance of 29 feet. Submerged piles, marked at the outer end by a 55-gallon drum, extend about 150 yards south-southeast from the west side of the entrance.

Essington, Mile 75N, has several boatyards that can provide berths, fuel, and supplies. Major hull and minor engine repairs to small craft can be made. Maximum haul-out capacities; marine railways, 50 feet; mobile lifts, 20 tons. Between Essington and Delaware River main channel is marshy **Little Tinicum Island,** which is about 2 miles long. There is a dike along the north shore of the passage east and north of Little Tinicum Island. An unmarked channel parallel to and about 450 feet from the centerline of the dike has a controlling depth of about 5½ feet; shoals are on both sides of the channel. Local vessels usually pass around the west end of the island where the controlling depth is about 9 feet.

A **special anchorage** is between the Essington waterfront and Little Tinicum Island. (See **110.1** and **110.67,** chapter 2, for limits and regulations.) Depths are 9 to 20 feet in the anchorage. The current velocity is about 1.3 knots. In 1978, a piling was reported in the anchorage area, about 0.5 mile eastward of the entrance to Darby Creek.

Gasoline, diesel fuel, water, ice, berths, and marine supplies are available along the Essington waterfront eastward of Darby Creek. Maximum haul-out capacities are: railway, 125 feet; lift, 15 tons.

A railroad car-float bridge is on **Thompson Point** on the New Jersey side opposite the west end of Little Tinicum Island. Between Thompson Point and **Crab Point,** 0.5 mile to the eastward, are the large buildings of the E.I. duPont de Nemours and Co., Repauno Plant. The plant has two wharves which provide 1,440 feet of berthing space with depths of 3 to 35 feet reported alongside; deck height is 10 feet. There are water and electrical shore-power connections and rail and highway connections. It is used for receipt and shipment of sulfuric acid and anhydrous ammonia.

A **general anchorage** is between Thompson Point and Crab Point, and the south side of the main channel. (See **110.1 and 110.157 (a)(9) and (b),** chapter 2, for limits and regulations.) The current velocity is about 2 knots a half-mile east of Crab Point.

There are several large petroleum facilities at **Paulsboro,** Mile 77S. All have railroad and highway connections and freshwater, only the Exxon Wharf has electrical shore-power connections.

Mobile Oil Corp., Paulsboro Refinery Tug Wharf: on Bramell Point, at the west end of the Paulsboro waterfront; 2,389-foot marginal wharf providing 2,256 feet of berthing space; 34 feet alongside; deck height 12½ feet; 6-million-barrel storage capacity; used for the receipt of crude oil, petroleum products, and sodium silicate, and shipment of

bulk and packaged petroleum products, bunkering vessels; owned and operated by Mobil Oil Corp.

Mobil Oil Corp. Paulsboro Refinery Tanker Wharf: immediately west of marginal wharf; face 115 feet, 775 feet usable with dolphins; 40 feet alongside; deck height, 12½ feet; receipt of petroleum products, crude oil, bunkering of vessels; owned and operated by Mobil Oil Corp.

Exxon Co., U.S.A., Paulsboro Terminal Wharf, 0.9 mile eastward of Bramell Point; offshore wharf which provides 900 feet of berthing space with dolphins; 36 to 40 feet alongside; deck height 13 feet; 1.5-million-barrel storage capacity; receipt and shipment of petroleum products and bunkering vessels; owned and operated by Exxon Co., U.S.A.

BP Oil Paulsboro Terminal Piers, 1.5 miles eastward of Bramell Point, has two offshore wharves; 1,653 feet of berthing space; depths of 17 to 36 feet alongside; deck heights 12 feet; 3.5-million-barrel storage capacity; receipt and shipment of petroleum products, petrochemicals, and bunkering vessels; owned and operated by BP Oil, Inc.

Mantua Creek, Mile 78S, passes on the east side of Paulsboro and meanders southeastward to the vicinity of **Mantua**, 7.6 miles above the mouth. There is waterborne traffic in chemicals and paper to the first bridge; above which the creek is used only by small boats.

The Mantua Creek entrance jetties are marked by lights, and the entrance channel is marked by buoys. In July 1981, the controlling depths in the dredged channel were 14 feet for about 0.7 mile above the mouth, thence 7 feet to **Friars Landing**, about 2.3 miles above the mouth, thence 4½ feet to **Parkers Landing**, about 4.5 miles above the mouth, and thence less than 1 foot to Mantua. The mean range of tide is 5.7 feet in the entrance.

The ConRail bridge 1.3 miles above the mouth has a 32-foot-wide swing span with a clearance of 1 foot. State Route 44 highway bridge, 1.5 miles above the mouth, has a vertical-lift span with clearance of 5 feet down and 64 feet up. (See **117.1 through 117.59 and 117.729**, chapter 2, for drawbridge regulations.) Above this point, the fixed bridges and overhead cables have minimum clearances of 10 feet and 50 feet, respectively.

The wharves below the first bridge on Mantua Creek have depths of 20 to 14 feet alongside.

A **general anchorage** is on the southeasterly side of the main channel above the entrance to Mantua Creek. (See **110.1 and 110.157 (a) (10) and (b)**, chapter 2, for limits and regulations.) The current velocity is about 2 knots in the channel opposite the anchorage.

On the northeast side of the Delaware River at Mile 78N, there are two petroleum terminals both of which have railroad and highway connections and water.

Hog Island Wharf of Gulf Oil Co., U.S. (39°51′40″N., 75°14′15″W.) provides 2,754 feet of berthing space with dolphins; 38 feet reported alongside; deck height, 16 feet; 4¼-million-barrel storage capacity; receipt of crude oil and naphtha; owned by city of Philadelphia, operated by Gulf Oil Co., U.S.

Mantua Chemical Terminal, Paulsboro Main Dock, just east of the entrance to Mantua Creek, has a pier with a 40-foot face providing 1,000 feet of usable berthing space with dolphins, 40 feet alongside; deck height, 10 feet; pipelines extend from wharf to storage tanks; 3-million-barrel storage capacity; receipt and shipment of petroleum products and chemicals; owned and operated by Mantua Chemical Terminal, Inc.

Arco Pipe Line Co., Fort Mifflin Terminal Wharf Berths A and B (39°52′12″N., 75°13′05″W.): 1,845 feet of berthing space with dolphins; 40 feet alongside; deck height, 15 feet; 570,000-barrel storage capacity; receipt and shipment of petroleum products, crude oil, and bunkering of vessels; owned and operated by Arco Pipe Line Co.

Old **Fort Mifflin**, Mile 79.5N, is the site of the Corps of Engineers wharves, which have depths of 10 to 30 feet at their outer ends.

Woodbury Creek, Mile 79.5S, is used only by small craft; local knowledge is needed. The approach must be made from the west-southwest because of the 2-foot shoal directly off the creek. At low water the channel within the creek is well defined. In July 1981, the controlling depth was 6 feet to the first bridge; thence in 1965, reported depths of 6 to 3 feet were available to the second bridge, about 1.5 miles above the mouth; thence depths of less than 1 foot to Woodbury, 2.7 miles above the mouth. The mean range of tide is 5.7 feet in the entrance. The highway bridge 0.8 mile above the mouth has a fixed span with a clearance of 15 feet. An overhead power cable close westward of the bridge has a clearance of 35 feet. Above this point, fixed bridges and overhead cables have a minimum clearance of 4 feet and 45 feet, respectively.

Chart 12313.–Philadelphia, one of the chief ports of the United States, is at the junction of Delaware and Schuylkill Rivers. The midharbor point along Delaware River is at Chestnut Street, Mile 86.5W.

The Port of Philadelphia, as defined for Customs purposes, comprises such waters of the Delaware and Schuylkill Rivers bordering on the municipality as are navigable; the municipal limits on Delaware River extend from Fort Mifflin on the south to Poquessing Creek on the north, a distance of about 20 miles.

Large quantities of general cargo are handled at the port in both foreign and domestic trade. In addition, crude petroleum and petroleum products, sugar, and ore are imported, while coal, grain, and refined petroleum products are exported. Coastwise receipts are mostly crude petroleum and petroleum products, and shipments consist chiefly of refined petroleum products.

Channels.–A Federal project provides for a channel 40 feet deep from the sea through the main channel in Delaware Bay and River to the Philadelphia Naval Shipyard, Mile 81; thence 40 feet on the west side and 37 feet on the east side through Philadelphia Harbor to Allegheny Avenue, Mile 89; thence 40 feet to the U.S. Steel basin opposite Newbold Island, Mile 110; and thence dredging depths of 25 feet to the Trenton Marine Terminal, Mile 115. (See Notice to Mariners and the latest editions of the charts for controlling depths.)

Note.–In the Philadelphia-Trenton section of the river, masters are especially requested to limit speed of their vessels when passing wharves and piers so as to avoid damage by suction or wave wash to property or persons.

Anchorages.–General and naval anchorages are at Philadelphia. (See **110.1 and 110.157**, chapter 2, for limits and regulations.)

Bridges.–Walt Whitman Bridge, Mile 84, a highway suspension bridge connecting Philadelphia with Gloucester City, has a clearance of 150 feet at the center of the main span, and minimum clearance of 139 feet under the full width of the main span. **Benjamin Franklin Bridge**, Mile 86.8, 0.3 mile above Chestnut Street, has a suspension span with a clearance of 135 feet for the middle 800 feet of the main span and 129 feet under the rest of the span.

Tides.–The mean range of tide is about 5.9 feet at Philadelphia. (See the Tide Tables for daily predictions.)

Towage.–A large fleet of tugs up to 3,300 hp is available at Philadelphia, day and night, for any type service required.

As a general rule, tugs are not required for vessels moving between Philadelphia and the sea; most vessels traverse this distance under their own power.

Weather.–The proximity of Philadelphia to Delaware Bay probably has some effects on temperature conditions locally. Periods of extended cold weather are relatively rare, with below zero readings reported only 24 times since official records began. Sustained periods of very high or low temperatures seldom last more than 3 or 4 days as conditions change fairly rapidly. Due to the prevalence of maritime air during the summer months, the humidity adds to the discomfort of the high temperatures. Fog can be expected during the autumn and winter.

Precipitation is fairly evenly distributed throughout the year with maximum amounts during the late summer. Much of the summer rainfall is in connection with local thunderstorms. Single snow storms of 10 inches or more occur about every 5 years.

The prevailing wind direction for the summer is from the southwest, while northwesterly winds prevail during the winter. The annual prevailing direction is from the west-southwest. Destructive velocities are comparatively rare and occur mostly in gusts during summer thunderstorms. High winds in the winter, as a rule, come with the advance of cold air after the passage of a deep low-pressure area. Only rarely have hurricanes in the vicinity caused widespread damage, then primarily through flooding.

Flood stages in the Schuylkill River normally occur about twice a year. Flood stages seldom last over 12 hours and usually occur after excessive falls of precipitation during summer thunderstorms. Flood stages in the Delaware River are caused by abnormally high tides due to the water "backing up" under the influence of strong south or southeast winds.

The office of the National Weather Service is at the Philadelphia International Airport at the southwestern end of the city. **Barometers** may be compared there or checked by telephone. (See page T–5 for **Philadelphia climatological table.**)

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) Vessels subject to boarding for quarantine inspection are required to anchor off Marcus Hook boarding station. (See **110.1 and 110.157 (a) (8), and (b),** chapter 2, for quarantine anchorage regulations and limits.)

Philadelphia is a **customs port of entry.**

Coast Guard.–The Marine Inspection Office maintains a **vessel documentation** office in the U.S. Customhouse.

The U.S. Coast Guard **Captain of the Port** maintains an office at the Coast Guard Base in Gloucester City (39°53.9′N., 75°07.7′W.).

Harbor regulations.–Local rules and regulations are enforced by the Navigation Commission for the Delaware River (Pennsylvania). The authority of the Commission extends from the Pennsylvania-Delaware boundary line on the south to the head of the navigable waters of Delaware River on the north. Copies of the regulations may be obtained from the Navigation Commission for the Delaware River (Pennsylvania), 1400 W. Spring Garden Street, Philadelphia, Pa. 19130.

Wharves.–Philadelphia has more than 45 deep-water piers and wharves along its Delaware River waterfront and along Schuylkill River. Most of the piers and wharves have highway and railroad connections. The port is served by three rail lines: Baltimore and Ohio Railroad, ConRail, and the Reading Co. Each of these carriers connect with tracks of the Philadelphia Belt Line Railroad which extends along the main part of the port's Delaware River waterfront. Freshwater is piped to most piers and wharves; electrical shore-power connections, if available, are mentioned under the particular facility.

The Schuylkill River wharves and piers are mostly used to handle bulk petroleum products. Most of the general cargo piers and wharves are between the Walt Whitman Bridge and Port Richmond, 2 miles above the Benjamin Franklin Bridge, and at Ten Mile Point, 7 miles above the Benjamin Franklin Bridge.

Coal and ore are handled at the facilities south of Greenwich Point, just below the Walt Whitman Bridge. Coal, ore, grain, and other bulk cargoes are also handled at Port Richmond.

Cargo is generally handled by ships' tackle; special handling equipment, if available, is mentioned in the description of the particular facility. A barge crane with an 800-ton capacity is available by special arrangement; a 375-ton crane is also available.

The alongside depths for each facility are reported. (For information on the latest depths contact the Port of Philadelphia or the private operator.) Only the major deep-draft facilities are described. For a complete description of the port facilities refer to Port Series No. 8, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

Facilities in Schuylkill River, East Bank:

Girard Point Pier 1: about 75 yards above Interstate 95 bridge (39°53′34″N., 75°11′50″W.); west side 1,092 feet long; 31 feet alongside; deck height, 11 feet; two 35-ton gantry cranes; 3 acres of open storage; receipt and shipment of general cargo and miscellaneous bulk commodities, including scrap metal, steel, and heavy machinery; receipt of ores; owned and operated by Delaware Operating Co.

Girard Point Pier 2: about 100 yards west of Pier 1; face 260 feet long, 36 to 28 feet alongside; east side, 1,036 feet long; 28 feet alongside; west side, 927 feet long, 34 to 36 feet alongside; deck height, 11 feet; 85,000 square feet of covered storage; 4 acres of open storage; forklifts to 25 tons; receipt and shipment of general and containerized cargo; owned by Independent Terminal Co.; operated by Independent Co.

Girard Point Grain Elevator Pier 3: about 100 yards west of Pier 2; east side 882 feet long, 36½ feet alongside; west side 400 feet long, 31 to 27 feet alongside; deck height, 11 feet; pneumatic unloading tube can unload 8,500 bushels of grain per hour; fifteen loading spouts can load 60,000 tons per hour; grain elevator has 2¼-million-bushel capacity; receipt and shipment of grain; electrical shore-power connections; owned and operated by Tidewater Grain Co.

Gulf Oil Co., U.S. Wharves 1, 2, and 3: about 0.2 mile above Interstate 95 bridge; 2,075 of berthing space; 32 feet alongside; deck height, 12 feet; pipelines extend from wharf to storage; storage capacity of 4 3/4-million barrels; receipt and shipment of petroleum products, crude oil, cumene, and benzene, bunkering vessels; owned and operated by Gulf Oil Products Co.

Atlantic-Richfield Co. Atlantic Wharf: adjacent to lower side of Passyunk Avenue Bridge (39°59′10″N., 75°12′08″W.); 1,775 feet with dolphins; 30 to 25 feet alongside; deck heights, 17 and 12 feet; pipelines extend from wharf to storage tanks with total capacity of 952,000 barrels; receipt of crude oil and shipment of petroleum products by barge and tanker; owned and operated by the ARCO Petroleum Products Co.

Facilities in Schuylkill River, West Bank:

U.S. Gypsum Co. Wharf: about 0.9 mile above Passyunk

Avenue Bridge; 472-foot face; 25 to 27 feet alongside; deck heights, 8 and 11½ feet; conveyor unloading system, rate 500 tons per hour; storage capacity for 44,000 tons of gypsum rock; receipt of gypsum rock by self-unloading vessel; owned and operated by U.S. Gypsum Co.

ARCO Petroleum Products Co. West Yard, Berth 3: about 0.22 mile below Passyunk Avenue Bridge; 20-foot face; 200 feet with dolphins; 26 to 20 feet alongside; deck height, 12 feet; one ½-ton hand-operated, hose-handling derrick; pipelines extend from wharf to storage tanks; receipt and shipment of petroleum products; owned and operated by ARCO Petroleum Products Co.

ARCO Petroleum Products Co., West Yard, Berth 4: about 0.27 mile below Passyunk Avenue Bridge; 600 feet with shore moorings; 29 feet alongside; deck height, 17 feet; pipelines extend from wharf to storage tanks with total capacity for 785,000 barrels; receipt and shipment of petroleum products by tanker and barge; owned by ARCO Petroleum Products Co; operated by ARCO Petroleum Products Co. and Amoco Oil Co.

Exxon Barge Dock: about 1.2 miles above Interstate 95 bridge; 180 feet with dolphins; 33 feet alongside; deck height, 10 feet; one 2-ton overhead chain hoist; pipelines extend from wharf to storage tanks; 908,600-barrel storage capacity; receipt of petroleum products by barge; owned and operated by Exxon Co., U.S.A.

Facilities in Delaware River, south of Benjamin Franklin Bridge (39°57′10″N., 75°08′07″W.):

Greenwich Coal Pier 124S: about 0.66 mile south of Walt Whitman Bridge (39°54′18″N., 75°09′47″W.); 168-foot face, 40 feet alongside; south side 1,073 feet long; 40 feet alongside; north side 1,015 feet long, 25 to 30 feet alongside; deck height, 11 feet; loading capacity 5,000 tons per hour; shipment of coal; owned by ConRail; operated by Conrail and Northern Contracting Co.

Greenwich Ore Pier 122S: about 0.62 mile southwest of Walt Whitman Bridge; north and south sides 850 feet long; 40 feet along the north and south sides; deck height, 12 feet; four cranes, unloading rate 1,200 tons per hour; electric conveyor and hopper system; 2-million-ton iron ore open storage; receipt of ore; owned by ConRail and operated by Pennsylvania Tidewater Dock Co.

Packer Ave. Marine Terminal: adjacent to south end of Walt Whitman Bridge; 3,150 feet of berthing space with dolphins; 817-foot roll-on/roll-off berth; 35 feet alongside; deck height, 13 feet; 64 acres open storage; 369,000 square feet covered storage; 1½-million cubic-feet of cold-storage warehouses; one 375-ton crane; two 45-ton container diesel electric cranes; forklift trucks; receipt and shipment of general cargo, containers, roll-on/roll-off cargo, and steel; electrical shore-power connections; owned by the city of Philadelphia and General State Authority of Pennsylvania; operated by Delaware Operating Co.

Pier 100S: about 0.22 mile northward of Walt Whitman Bridge; north side 1,140 feet long; 18 feet alongside; deck height, 13 feet; electrical shore-power connections; receipt and shipment bulk liquid commodities, receipt of petroleum products; owned by city of Philadelphia, operated by Publicker Industries, Inc., and Curtis Bay Towing Co.

Pier 98S: about 0.3 mile northward of Walt Whitman Bridge; south side 1,500 feet long, north side 1,485 feet long; 33 feet alongside; deck height, 14 feet; 292,500 square feet of covered storage; 24 acres of open storage; electric and water connections; shipment of bagged commodities including grain; owned by city of Philadelphia; operated by Grain Bagging and Shipping, Ltd.

Pier 96S: 75 yards northward of Pier 98S; south side 1,320 feet long, north side 1,220 feet long; 30 feet alongside; deck height, 14 feet; 92,000 square feet of covered storage; 130,000 square feet of open storage; electric and water connections; owned by city of Philadelphia; operated by Philadelphia Port Corporation.

Pier 84S: 0.6 mile northward of Walt Whitman Bridge; 385-foot face, 30 feet alongside; north and south sides 855 feet long; 30 feet alongside; deck height, 10 feet; 503,000 square feet of covered storage; two 12-ton electric, truck elevators; six 5-ton electric freight elevators; six cargo chutes; receipt and shipment of general and containerized cargo; receipt of newsprint; electrical shore-power connections; owned by the city of Philadelphia and operated by Lavino Shipping Company.

Pier 82S: northward of Pier 84S; 345-foot face, 32 to 30 feet alongside, deck height, 11.7 feet; south side 855 feet long, 32 feet alongside, deck height, 7.7 feet; north side 1,139 feet long, 31 feet alongside, deck height, 11.7 feet; 78,000 square feet covered storage; 8 acres of open storage; owned by the city of Philadelphia and operated by Lavino Shipping Company.

Pier 80S: northward of Pier 82S; 358-foot face; south side 1,150 feet long; north side 1,003 feet long; 30 to 35 feet alongside; deck height, 11 feet; 254,000 square feet covered storage; 4 acres open storage; electrical shore-power connections; receipt and shipment of conventional and containerized general cargo; owned by the city of Philadelphia, operated by Independent Pier Co.

Pier 78S: northward of Pier 80S; 250-foot face, 30 to 29 feet alongside; south side 836 feet long, 28 feet alongside; north side 877 feet long, 30 feet alongside; deck height, 11.5 feet; 312,000 square feet covered storage; elevators up to 8-ton capacity; electrical shore-power connections; receipt and shipment of general cargo; owned by the city of Philadelphia, operated by Philadelphia Port Corp.

Pier 38–40S: about 1.2 miles below Benjamin Franklin Bridge; 620-foot face, 35 feet alongside; south side, 551 feet long, 30 feet alongside; north side 550 feet long, 30 feet alongside; deck height, 13 feet; 357,000 square feet of covered storage; 2½ acres of open storage; four 3½-ton electric freight elevators; electrical shore-power connections; receipt and shipment of general cargo; owned by the city of Philadelphia; operated by Philadelphia Port Corporation.

Facilities at Port Richmond:

Pier E, 0.58 mile northeastward of Pier 14; 54-foot face, 35 feet alongside; southwest side 850 feet long, 40 feet alongside; northeast side 850 feet long, 35 feet alongside; deck height, 10 feet; 18 loading spouts; loading rate 50,000 bushels of grain or 1,500 tons of coal per hour; electrical shore-power connections; shipment of grain, coal, and coke; storage capacity over 3 million bushels; owned by ConRail Corp., and operated by Farmers Export Co-op, Inc. and Energy Terminals, Inc.

Tioga II Marine Terminal Wharf (39°58′36″N., 75°05′41″W.): 736-foot face, 32 feet alongside; northeast side 620 feet long, 32 feet alongside; southwest side 626 feet long (depths alongside, unknown); deck height, 10.6 feet; two gasoline cranes; electrical shore-power connections; 115,000 square feet of covered storage; 10 acres of open storage; pipelines extend from wharf to storage tanks with 1.2-million-barrel capacity; receipt and shipment of petroleum products, chemicals, and miscellaneous bulk liquids at Berth No. 2. Berth No. 1 was built for handling containerized cargo but in 1984 was not in use; owned by city of Philadelphia; operated by Unitank Terminal Service and I.T.O. Corp. of Ameriport.

Tioga I Marine Terminal Wharf (39°58′42″N., 75°05′10″W.): 3,172-foot face, north side 725 feet long, roll-on/roll-off berth on south side 610 feet long; 40 feet

alongside; deck height, 12 feet; 300,000 square feet of covered storage; 62 acres of paved open container storage; two 45-ton container cranes; receipt and shipment of conventional, containerized, and roll-on/roll-off cargo; owned by city of Philadelphia; operated by I.T.O. Corp. of Ameriport

Upper Delaware River (chart 12314):

Northern Shipping Co. Pier Berths 5–7 (40°01′16″N., 75°01′16″W.): 200-foot face, 32 feet alongside; southwest side 478 feet long, 30 feet alongside; northeast side 873 feet long, 32 feet alongside; deck height, 12 feet; two 75-ton gantry cranes; 10 acres of open storage; electrical shore-power connections; receipt and shipment of general cargo; receipt of scrap metal; owned and operated by Northern Association.

Northern Shipping Co. Wharf: northeastward of Berths 5–7; Berths 1, 2, face 1,200 feet long, 36 feet alongside; Berths 3, 4, 1,200-foot-long southwest side, 36 feet alongside; deck height, 14 feet; 180,000 square feet covered storage; 100 acres open storage; cranes are available at Northern Shipping Co. Barge Pier Berths 8–9, adjacent to Berths 5–7; forklift trucks are available; receipt and shipment of conventional and containerized general cargo, motor vehicles, bulk materials, scrap metal, steel, and steel products; owned and operated by Northern Association.

Supplies.–All types of marine supplies and services are available in the Philadelphia area. Bunker oil and diesel oil can be obtained at terminals along the Schuylkill River. Other bunkering terminals are at Marcus Hook, Paulsboro, and Eagle Point. Most larger vessels receive fuel from barges alongside.

Repairs.–Major repairs to large vessels can be made at the Sun Ship, Inc. yard at Chester, Pa., previously discussed in this chapter.

There are several shore-based firms engaged in the field of general ship repairs; work is done on the vessel or in the company shops. Repairs to small vessels can be made at shipyards on Cooper Point in Camden. Small-craft repair facilities are at Dredge Harbor, N.J., and Essington, Pa., described earlier in this chapter.

Communications.–Philadelphia is served by three major railroad systems. More than 100 steamship lines operate to and from the port. Several major airlines provide frequent scheduled service between Philadelphia International Airport, 5.5 miles southwest of City Hall, and domestic and overseas points.

Schuylkill River, Mile 80N, is navigable for 7.3 miles to **Fairmount Dam** and is an important outlet for a part of the commerce of Philadelphia.

The Federal project provides for a channel 33 feet deep to Passyunk Avenue bridge, 3.1 miles above the mouth, thence 26 feet deep to Gibson Point, 4 miles above the mouth, and thence 22 feet deep to University Avenue bridge, 5.3 miles above the mouth. Above that point most of the wharves have depths of about 12 feet at their faces. (See Notice to Mariners and latest edition of the chart for controlling depths.)

A light marks the outer end of a sunken jetty on the east side of the entrance to Schuylkill River and a fog signal is on the west side. A **021°30′** lighted range marks the entrance, and buoys mark the channel within the river as far as the railroad bridge, 4.5 miles above the mouth.

Within its project limits, Schuylkill River is crossed by six bridges; the first two, Interstate 95 at Girard Point and the George C. Platt Memorial highway (Penrose Avenue) bridges, 0.6 mile and 1.3 miles, respectively, above the mouth, have fixed spans with clearances of 135 feet. The fixed highway bridge about 4.8 miles above the entrance has a clearance of 50 feet. The others, all drawbridges, have a minimum clearance of 15 feet. (See **117.1 through 117.59 and 117.905,** chapter 2, for drawbridge regulations.) The bridgetender of the railroad swing bridge, 4.3 miles above the mouth, monitors VHF-FM channel 13; call sign KXS–238.

Above the University Avenue bridge, the limiting clearance of the fixed bridges is 16 feet. The railroad bridge, 5.6 miles above the mouth, has a swing span with a clearance of 26 feet. (See **117.1 through 117.59 and 117.905,** chapter 2, for drawbridge regulations.)

In 1980, a bascule highway bridge was under construction immediately above the Passyunk Avenue bridge, 3.1 miles above the entrance. The bridge has a design clearance of 50 feet, and when open the bascule spans will overhang the channel edges at a height of 135 feet; when completed it will replace the existing bridge.

The overhead cables above the University Avenue bridge have a minimum clearance of 70 feet.

The mean range of tide is about 5.7 feet in Schuylkill River. The current velocity is about 0.5 knot in the entrance.

The confluence of Schuylkill and Delaware Rivers is the center of the petroleum industry in the city of Philadelphia. The deep-draft piers and wharves along the river were described previously in this chapter under Wharves. Most of the other wharves and piers along the river have depths of 9 to 12 feet at their faces.

League Island, now a part of the mainland at the junction of Delaware and Schuylkill Rivers, is the site of the **Philadelphia Naval Shipyard.** The reservation has a frontage of 0.6 mile on the east side of Schuylkill River and 2 miles on the north side of Delaware River. **Reserve Basin,** in the northwest part of the reservation, is used to store vessels of the reserve fleet. A ferry operates across Delaware River from midway along the League Island waterfront to National Park, N.J.

Texaco, Inc. Refinery (39°52′43″N., 75°09′30″W.), east of **Eagle Point,** Mile 81.8S, has an offshore wharf which provides 1,662 feet of berthing space. Depths of 43 feet are reported alongside, and deck height is 16 feet. There are railroad and highway connections. Water connection is at the wharf. Petroleum products are received and shipped at the refinery; pipelines extend from wharf to storage tanks with total storage capacity for about 8.5-million barrels; vessels can be bunkered at the rate of 1,500 barrels per hour.

Big Timber Creek, Mile 82.9S (see also chart 12312), has a dredged entrance channel, which, in 1980, had a centerline controlling depth of 5 feet through the buoyed flats at the entrance, thence 7 feet at centerline to the fixed highway bridge at Westville, 1 mile above the mouth. Local knowledge is needed to navigate the channel beyond the buoys. The minimum clearance of the fixed bridges at **Westville,** about 1 mile above the mouth, is 14 feet. Above Westville, the fixed bridges have a least horizontal clearance of 27 feet and a least vertical clearance of 7½ feet. The overhead cables crossing the creek have a least clearance of 30 feet.

The oil and chemical barge wharves on the northeast side of the entrance to Big Timber Creek have depths of about 12 feet at their faces. Above here, the creek is little used except by pleasure craft. Several marinas are along the creek; slips, gasoline, and some marine supplies are available. Hull and engine repairs can be made. Maximum haul-out capacities: railway, 48 feet; lift, 10 tons.

Gloucester City, Mile 83.5, is the site of large manufacturing plants. A Coast Guard base is about midway along the 1.3-mile waterfront. The three deep-draft facilities along the waterfront, which are described below, have railroad and highway connections.

Koch Fuels, Gloucester City Dock (39°53′41″N., 75°07′52″W.), about 0.6 mile south of Walt Whitman Bridge, has a T-head pier providing 850 feet of berthing space with dolphins. Depths of 35 feet are reported alongside; deck height, 12 feet; receipt and shipment of petroleum products; owned and operated by Koch Fuels Inc.

Holt Cargo Systems, Piers 8 and 9 (39°54′11″N., 75°15′36″W.), about 175 yards below Walt Whitman Bridge provide 2,140 feet of berthing space with 35 to 45 feet alongside; deck height, 12 feet; two 40-ton container cranes; about 100,000 square feet of covered storage and 40 acres of open storage; receipt and shipment of general and containerized general cargo; owned and operated by Holt Cargo Systems, Inc.

Holt Cargo Systems, Pier 7, is about 300 yards north of Walt Whitman Bridge on the south side of Newton Creek; 2,130 feet of berthing space with 24 to 40 feet alongside; deck height, 12 feet; two 150-ton cranes and forklift trucks with lifting capacity to 25 tons; about 250,000 square feet of covered storage and about 90 acres of open storage; receipt and shipment of general cargo; owned and operated by Holt Cargo Systems, Inc.

The current velocity is about 2.1 knots off Gloucester City.

Newton Creek, Mile 84.2E, forms the boundary between Gloucester City and Camden. Navigation is blocked 500 yards above the mouth by low fixed bridges.

Camden, N.J., is an important manufacturing center directly opposite Philadelphia, with which its industrial and shipping activities are closely allied. The South Jersey Port Corporation, with headquarters at Camden, has jurisdiction over the New Jersey ports bordering Delaware River and Bay from Trenton to the ocean.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Wharves.–The Camden city waterfront extends about 3.4 miles from Newton Creek to Cooper River; also included are the petroleum terminals at Pettys Island and Fisher Point Dike. All of the wharves have highway and some have railroad connections. Camden is served by ConRail. Beckett Street and Broadway Terminals have fresh water and electrical shore-power connections. MacAndrews and Forbes Co. Pier has water connections.

Cargo is generally handled by ships' tackle; special handling equipment, if available, is mentioned in the description of the particular facility. An 800-ton floating crane is available at Philadelphia by special arrangement; a 375-ton heavy lift crane is also available at Philadelphia.

The alongside depths for each facility are reported. (For information on the latest depths contact the South Jersey Port Corp. or the private operator.) Only the major deep-draft facilities are described. For a complete description of the port facilities refer to Port Series No. 8, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

Broadway Terminal, Pier 6 (39°54′28″N., 75°07′27″W.), on the north side of Newton Creek: 1,445 feet long; 18 to 32 feet alongside; deck height, 12 feet; owned and operated by South Jersey Port Corp.

Broadway Terminal, Pier 5, on the north side of former graving dock 100 yards north of Berth 6: 1,100 feet long; 35 feet alongside; deck height, 12 feet; 129,000 square feet of covered storage; 30 acres of open storage; one 80-ton crane; receipt and shipment of conventional and containerized general cargo; owned and operated by South Jersey Port Corp.

Broadway Terminal, Pier 2, 0.37 mile north of Berth 6: face 62 feet long, north side 809 feet long, south side 1,005 feet long, 35 feet alongside; deck height, 12 feet; vessel mooring and repair; owned by South Jersey Port Corp. and operated by South Jersey Port Corp. and McAllister Brothers, Inc.

Broadway Terminal, Berths 1 and 1A, 80 yards north of Pier 2: face (Berth 1A), 443 feet long, 35 feet alongside; south side (Berth 1), 856 feet long, 35 to 40 feet alongside; deck height, 11 feet; 59,600 square feet of covered storage; 22 acres of open storage; one 40-ton gantry crane; being developed as a deep-draft coal export facility; owned and operated by South Jersey Port Corporation.

MacAndrews and Forbes Co. Pier, 0.21 mile above Broadway Terminal Berth 1: face 252 feet long, 30 feet alongside; south side, 427 feet long, 22 to 30 feet alongside; north side, 388 feet long; deck height, 16 feet; receipt of licorice root, and fuel oil for plant consumption; owned and operated by MacAndrews and Forbes Co.

Flintkote Co. Wharf (39°55′51″N., 75°07′57″W.): offshore wharf, 410 feet long; 30 feet alongside; deck height, 11 feet; open storage for 200,000 tons of gypsum rock; receipt of gypsum rock and fuel oil for plant consumption; owned and operated by The Flintkote Co.

Beckett Street Terminal Wharf (39°56′16″N., 75°07′55″W.): marginal wharf 2,290 feet long; 30 to 40 feet alongside; deck height, 11 feet; 222,500 square feet of covered storage; 57 acres of open storage; cranes to 85 tons, and forklift trucks are available; receipt and shipment of general and containerized cargo and steel; receipt of lumber, ores, coal, salt, and dry bulk commodities; shipment of scrap metal; owned and operated by South Jersey Port Corporation.

Citgo Petroleum Corp. Pettys Island Terminal (39°58′13″N., 75°06′00″W.): 800 feet of berthing space with dolphins; 30 feet alongside; deck height, 11 feet; 1-million-barrel storage capacity for petroleum products; 165,000-barrel storage capacity for asphalt; receipt and shipment of petroleum products and asphalt; owned by Citgo Petroleum Corp., and operated by Citgo Petroleum Corp. and West Bank Oil, Inc.

Texaco Tanker Dock (39°58′31″N., 75°04′35″W.): 197 feet of berthing space with dolphins; 29 feet alongside; deck height, 12 feet; over 1 million barrels storage capacity; receipt and shipment of petroleum products; owned and operated by Texaco, Inc.

Amerada Hess Corp., Dock 1 (39°58′40″N., 75°04′14″W.) (see also chart 12314): 265 feet berthing space with dolphins; 40 feet alongside; deck height, 13½ feet; 2-million-barrel storage capacity; receipt and shipment of petroleum products; owned and operated by Amerada Hess Corp.

There are no major repair facilities at Camden for large vessels. The nearest facilities are at Chester, Pa., discussed earlier in this chapter.

There are several shipyards at **Cooper Point,** above the Benjamin Franklin Bridge, that can make all kinds of above and below water repairs to small vessels. The largest floating drydock has a capacity of 850 tons, 182 feet long and 66½ feet wide, and has a depth of 12 feet over the keel blocks. The largest marine railway has a haul-out capacity of 750 tons.

Back Channel between **Petty Island** and the New Jersey shore has a controlling depth of about 10 feet; both entrances are buoyed, but care is necessary to avoid the foul ground extending from both shores. The railroad-highway

bridge over the northeastern end of Back Channel has a bascule span with a clearance of 12 feet. The bridge is maintained in the closed position. (See **117.717,** chapter 2, for drawbridge regulations.) Most of the boatyards along the New Jersey shore southward of Petty Island are inactive.

Cooper River empties into the south side of Back Channel, 0.6 mile above the southwest entrance. In June 1980, the centerline controlling depth was 6 feet to the end of the dredged channel. The channel through the flats at the entrance is buoyed. The mean range of tide is 5.9 feet in the entrance. The drawbridges over this section of the river have a minimum width of 20 feet and a clearance of 3 feet. (See **117.1 through 117.59 and 117.713,** chapter 2, for drawbridge regulations.) The petroleum wharf near the railroad bridge has a reported depth of 5 feet at its face.

Chart 12314.–Above Philadelphia, the 40-foot dredged channel continues to Newbold Island, Mile 110, thence the project depths are 25 feet to the Trenton Marine Terminal and 12 feet to the railroad bridge at Trenton. Depths above Newbold Island may be considerably below project depths. (See Notice to Mariners and latest edition of chart for controlling depths.)

The mean range of tide is 6.0 feet at Bridesburg and 6.8 feet at Trenton. Above Philadelphia the river usually is closed by ice for extended periods during January and February, and in severe winters navigation is practically suspended during these months; ice seldom forms before January.

During March and April, **freshets** 10 to 20 feet in height above mean low water may be expected at Trenton. The highest level is reached during the ice breakup in the spring; heavy rains do not ordinarily raise the level to more than 9 feet above mean low water. Freshets usually are not dangerous to shipping unless accompanied by ice. The 1903 freshet, highest on record, reached heights above low water of 21½ feet at Trenton, 19½ feet at Bordentown, and 13 feet at Bristol.

(See page T–6 for **Trenton Climatological table.**)

The ConRail railroad bridge, which crosses Delaware River from Bridesburg, Pa., to Delair, N.J., Mile 90.6, has a vertical-lift span with a clearance of 49 feet down and 135 feet up. (See **117.1 through 117.59 and 117.904,** chapter 2, for drawbridge regulations.) The bridgetender monitors VHF-FM channel 13; call sign KS–9970. An overhead power cable at the bridge has a clearance of 140 feet. The current velocity is 1.6 knots at the bridge.

The Betsy Ross fixed highway bridge, with a clearance of 140 feet, crosses the Delaware River at Mile 90.8.

The highway bridge that crosses Delaware River from Tacony, Pa., to Palmyra, N.J., Mile 93.0, has a bascule span with a clearance of 53 feet. (See **117.1 through 117.59 and 117.904,** chapter 2, for drawbridge regulations.) The bridgetender monitors VHF-FM channel 13; call sign KBA–328.

Gasoline and some supplies are available at a small boatyard on the west side of the bridge at Tacony; minor engine repairs can be made.

Dredge Harbor, Mile 96S, is a base for sand and gravel dredging equipment and yachts. The eastern entrance is closed by shoals. The western entrance has depths of about 10 feet, thence up to 15 feet inside. The sand and gravel wharves on the northeast side of the harbor have depths of 8 to 10 feet at their outer ends. Berths, gasoline, diesel fuel, and marine supplies are available at several marinas in the harbor. Hull and engine repairs can be made. Maximum haul-out capacity: lift, 30 tons.

Rancocas Creek, Mile 96S, has some sand and gravel barge traffic as far as the first bridge; above this point the creek is used only by pleasure boats. Depths are about 5 feet to **Centerton** 6 miles above the mouth. The channel is narrow and crooked above Bridgeboro and in general follows ebb-tide bends back and forth between shoals; navigation is difficult without local knowledge. The entrance to the creek is marked by a buoy. The current velocity is about 1 knot in the entrance. There are small-craft facilities near the first bridge and at **Bridgeboro.** Berths, gasoline, and marine supplies are available. A small-craft facility at Bridgeboro can make hull and engine repairs to trailerable craft.

State Route 543 highway bridge, 1.3 miles above the mouth, has a swing span with a clearance of 4 feet. The railroad bridge, 0.2 mile above the highway bridge, has a swing span with a width of 42 feet and a clearance of 3 feet. U.S. Route 130 highway bridge at Bridgeboro, 2.6 miles above the mouth, has a bascule span with a clearance of 8 feet; overhead power and TV cables above and below the bridge have a least clearance of 51 feet. The State Route 38 bridge at Centerton, 6 miles above the mouth, has a swing span with a width of 48 feet in the south opening and a clearance of 6 feet. (See **117.1 through 117.59 and 117.745,** chapter 2, for drawbridge regulations.) Above this point, navigation is limited by fixed bridges, the least clearance being 6 feet at the Mount Holly bridge, 11.5 miles above the mouth.

In February 1984, a fixed highway bridge with a design clearance of 24 feet was under construction immediately west of the U.S. 130 bridge at Bridgeboro; when completed it will replace the existing bridge. In December 1986, it was reported that the fixed bridge was completed.

Poquessing Creek, Mile 97N, forms the upper boundary of the city of Philadelphia. The yacht club at **Torresdale,** a part of the city on the lower side of the creek, has a float landing where gasoline and some marine supplies can be obtained; depths at the float are 10 to 14 feet.

Mud Island, just above Poquessing Creek, is a flat which is partly submerged at high water and is covered with marsh grass in the summer. The channel between Mud Island and the Pennsylvania mainland has a controlling depth of about 7 feet. The lower part of the channel is used considerably as a small-boat anchorage.

Andalusia, Mile 97.5N, is a suburban residential community with few industries along the waterfront. A yacht club at **Cornwells Heights,** 1 mile eastward of Andalusia, has a float landing with about 10 feet alongside; gasoline, berths, and water are available on weekends only.

A wharf of a gypsum plant, with 783 feet of berthing space, extends 150 yards off the New Jersey side just west of Beverly, Mile 99S. Depths of 32 feet are reported alongside, and deck height is 10 feet. A conveyor system unloads gypsum rock. There are railroad and highway connections, water, and electrical shore-power connections.

Neshaminy Creek, Mile 100N, has depths of about 7 feet to the fixed highway bridge 0.7 mile above the mouth, thence about 4 feet for another 0.3 mile to where the creek has shoaled to bare. The fixed highway bridge has a clearance of 9 feet. There are several boatyards and marinas along the creek. Berths, gasoline, diesel fuel, water, and some marine supplies are available. Hull and engine repairs can be made. Maximum haul-out capacities: railway, 60 feet; lift, 20 tons.

At Mile 100.1N, a dredged channel leads to a small-craft basin at **Neshaminy State Park.** Berths, gasoline, ice, water, and electricity are available. In 1974, the controlling depth was 8 feet in the entrance channel and 4 feet in the basin. In 1978, shoaling was reported in the basin in about

40°04.6′N., 74°54.4′W. The mouth of the entrance channel is marked by a light.

The power cable over Delaware River at Mile 101.7 has a clearance of 140 feet. The highway bridge between Burlington N.J. and Bristol, Pa., at Mile 102.1 has a vertical-lift span with clearances of 62 feet down and 134 feet up. (See **117.1 through 117.59 and 117.904,** chapter 2, for drawbridge regulations.) The bridgetender monitors VHF-FM channel 13; call sign KBA–339.

Burlington, Mile 102.5S, fronts in part on the main channel of Delaware River and part on the auxiliary channel southeast of Burlington Island. Several industries are located at Burlington and its suburb, **East Burlington,** which is centered a mile along the auxiliary channel.

The Delaware River main channel continues along the northwest side of Burlington Island, and the auxiliary channel extends along the southeast side for 1.2 miles to a turning basin at the upper end of the U.S. Pipe and Foundry Co. In 1982, the controlling depth in the auxiliary channel was 6 feet (8 feet at midchannel), and depths of 10 to 17 feet were in the basin. Eastward of the turning basin, the back channel has natural depths of about 11 feet through the northeast entrance.

The overhead power cable about 0.3 mile northeast of the turning basin has a clearance of 45 feet.

The current velocity is 1.3 knots on the flood and 1.6 knots on the ebb in the main channel west of Burlington Island. In the back channel east of the island, the velocity is 0.9 knot on the flood and 1.8 knots on the ebb.

The public utilities wharf at the lower end of Burlington has reported depths of 20 feet at the face; other wharves have depths ranging from 7 to 12 feet. The town wharf, about 0.4 mile east of Assiscunk Creek, has depths of 12 feet reported alongside. An oil wharf, above the turning basin, has depths of about 12 feet at the outer face. A marina at the entrance to **Assiscunk Creek** has berths, gasoline, diesel fuel, ice, and some marine supplies. A 7-ton mobile hoist is available for hauling out vessels for hull and engine repairs.

Bristol, Mile 103.5N, was the terminus of the **Delaware and Lehigh Canal,** which was abandoned in 1931; the former Bristol entrance from the river is filled in. The public wharf at the lower end of the town has depths of about 3½ feet reported at the face. A yacht club near the upper end of Bristol has float landings with 8 feet reported alongside; water is available; members or guests may use the club railway to haul out boats up to 38 feet, but must make their own repairs.

At Mile 104.5S, Gold Bond Building Products operates a wharf which provides 420 feet of berthing space. Depths of 31 feet are reported alongside; deck height, 9 feet. There is an electrical shore power connection. There is a conveyor system for unloading gypsum rock and railroad and highway connections.

The fixed highway bridge at Mile 105.1 has a clearance of 135 feet.

At about Mile 105.9N, an oil company operates a wharf which has 875 feet of berthing space with dolphins. A depth of 37 feet is alongside; deck height, 15 feet. There are highway connections near the wharf. The facility is used for receipt of petroleum products.

Florence, Mile 107W, is a manufacturing community with no waterborne commerce.

Roebling, at Mile 108S, has a steel mill and furnace plant. The main wharf is 300 feet long and has depths of about 12 feet reported alongside, deck height, 8 feet. The plant has railroad and highway connections.

Newbold Island, just above the Roebling main wharf, is 1.5 miles long, with a greatest width of 0.7 mile. The main channel of Delaware River is along the north side of Newbold Island.

In September 1982, a section of the back channel, S of Newbold Island, between the island and the New Jersey mainland was reported to have shoaled to bare.

At Mile 109N is a basin where sand and gravel are handled. The wharves have depths of about 10 feet at their faces.

A slip of the Fairless Works, U.S. Steel Corp., Mile 109.4N, (40°08′12″N., 74°45′15″W.), opposite Newbold Island, provides about 4,000 feet of berthing space. Depths of 40 feet are reported alongside, and deck heights are 16½ and 18½ feet. There are cranes up to 25-ton capacities and a conveyor system with an unloading rate of 1,000 tons bulk ore per hour. The slip has 140 acres of open storage; receipt of iron ore, terromanganese, coal and coke, and shipment of iron and semifinished steel products. There are railroad and highway connections. The plant is owned and operated by U.S. Steel Corp.

Fieldsboro, Mile 110.5S, is a residential community with no waterborne commerce.

The current velocity in Whitehill Range off Fieldsboro is 1.4 knots on the ebb; the flood current is weak and of short duration.

Crosswicks Creek, Mile 111.1S, is used extensively by pleasure craft. Berths and gasoline can be obtained at one of the yacht clubs at Bordentown, near the mouth of the creek.

Bordentown, on the high bank on the southeast side of the entrance to Crosswicks Creek, was the terminus of the **Delaware and Raritan Canal,** which was abandoned in 1933.

Mariners are advised to stay in the dredged channel when navigating between Bordentown and Trenton, because of the rocky ledges and shoals bordering the channel.

On **Duck Island,** Mile 113E, there are two oil-receiving piers with 16 feet reported alongside, and a public utility coal pier with 25 feet reported alongside. Vessels stay in the main channel until north of the coal pier before heading toward shore and southward to the oil terminals to avoid the shoal area between the main channel and the terminals.

On the New Jersey shore between Duck Island and Trenton are small-craft facilities where gasoline, berths, water, and some marine supplies are available. Minor hull and engine repairs can be made.

A power cable with a clearance of 166 feet crosses the Delaware River at Mile 114.

Trenton, the capital of New Jersey, is at the railroad bridge crossing the river at Mile 116. The railroad bridge is the head of powerboat navigation. The city is an important manufacturing center.

Just below the railroad bridge, there is an oil-receiving wharf with depths of 10 to 15 feet alongside.

7. CHESAPEAKE AND DELAWARE CANAL

Chart 12277.–The **Chesapeake and Delaware Canal** is a sea-level waterway that extends from Delaware River at Reedy Point, Del., to **Back Creek** at Chesapeake City, Md., thence down Back Creek to Elk River and Chesapeake Bay. The Reedy Point entrance is 51 miles above the Delaware Capes, 35.5 miles below Philadelphia, 62 miles from Baltimore, and 187.5 miles from the Virginia Capes. **Miles** in the following text are the distances in nautical miles along the canal from the middle of Delaware River. **Reedy Point,** at Mile 0.7 on the north side of the Delaware entrance, is jettied and is marked by a light; the jetty on the south side is similarly marked.

Note.–The system of marking the channel with buoys and lights is from each entrance and reverses at Chesapeake City. Even numbers and flashing red lights are on the north side and odd numbers and flashing green lights are on the south side between the Delaware Bay entrance and Chesapeake City. Even numbers and flashing red lights are on the south side and odd numbers and flashing green lights are on the north side from Chesapeake City to the west end of the canal. Each bend along the canal is marked by an amber light.

In addition to the navigational aids, the north and south banks of the Chesapeake and Delaware Canal are lighted by mercury vapor luminaries spaced 500 feet apart on poles at a height of 25 feet mean high water. They are designed to illuminate the banks at the waters edge to assist ships navigating the canal at night. The poles are 250 feet apart with a light on every other pole (maintained by Corps of Engineers, U.S. Army).

COLREGS Demarcation Lines.–The lines established for Delaware Bay and Chesapeake Bay are described in **80.325** and **80.510,** chapter 2.

Navigation regulations.–The following regulations are from 33 CFR 162 and 33 CFR 207:

§162.40 Inland waterway from Delaware River to Chesapeake Bay, Del. and Md. (Chesapeake and Delaware Canal). (a) Applicability. The regulations in this section are applicable to that part of the inland waterway from Delaware River to Chesapeake Bay, Del. and Md., between Reedy Point, Delaware River, and Old Town Point Wharf, Elk River.

(b) Speed. No vessel in the waterway shall be raced or crowded alongside another vessel. Vessels of all types, including pleasure craft, are required to travel at all times at a safe speed throughout the canal and its approaches so as to avoid damage by suction or wave wash to wharves, landings, riprap protection, or other boats, or injury to persons. Pilots and vessel operators transiting the canal and its approaches are warned that violation of this rule may result in having their privilege to transit the canal suspended. Passages of vessels through the canal will be monitored and specific cases will be investigated where damage by suction or wave wash does occur. Owners and operators of yachts, motorboats, rowboats, and other craft are cautioned that large deep-draft ocean-going vessels and other large commercial vessels ply the canal, and such owners and operators should be particularly careful to moor or anchor well away from the main ship channels, with moorings and lines which are sufficient and proper.

(c) Right-of-way. All vessels proceeding with the current shall have the right-of-way over those proceeding against the current. Large vessels or tows must not overtake and attempt to pass other large vessels or tows in the waterway. All small pleasure craft shall relinquish the right-of-way to deeper draft vessels, which have a limited maneuvering ability due to their draft and size.

(d) Stopping in waterway. Vessels will not be permitted to stop or anchor in the ship channel.

(e) Water skiing. Water skiing in the waterway is prohibited between Reedy Point and Welch Point.

(f) Sailboats. Transiting the canal by vessels under sail is not permitted between Reedy Point and Welch Point.

§207.100 Inland waterway from Delaware River to Chesapeake Bay, Del. and Md. (Chesapeake and Delaware Canal); use, administration, and navigation. (a) Applicability. The regulations in this section are applicable to that part of the inland waterway from Delaware River to Chesapeake Bay, Del. and Md., between Reedy Point, Delaware River, and Old Town Point Wharf, Elk River.

(b) Supervision. The District Engineer, Corps of Engineers, Philadelphia, Pa., has administrative supervision over the waterway and is charged with the enforcement of these regulations. The District Engineer from time to time will prescribe rules governing the dimensions of vessels which may transit the waterway, and other special conditions and requirements which will govern the movement of vessels using the waterway. The District Engineer's representative is the Chesapeake City Resident Engineer. The Chesapeake City Resident Engineer through the dispatcher on duty will enforce these regulations and monitor traffic through the canal.

(c) Safe navigation required. Clearance for any vessel to enter or pass through any part of the waterway will be contingent on the vessel's having adequate personnel, machinery, and operative devices for safe navigation. In the event of question as to the ability of any vessel to navigate the waterway safely, a ruling will be made by the dispatcher. The owner, agent, master, pilot, or other person in charge of the vessel concerned may appeal the dispatcher's ruling to the District Engineer whose decision shall be final. A clearance by the dispatcher for a vessel's passage through the waterway shall not relieve the owners, agents, and operators of the vessel of full responsibility for its safe passage.

(d) Radio equipment. Requirements for radio equipment on vessels transiting the waterway are as described in rules governing traffic through the waterway issued by the District Engineer. Vessels not having the mandatory radio equipment will not be permitted to transit the canal.

(e) Anchorage and wharfage facilities. The anchorage basin at Chesapeake City and free wharfage facilities on the west side of the anchorage basin are available for small vessels only. These facilities are of limited capacity, and permission to occupy them for periods exceeding 24 hours must be obtained in advance from the dispatcher at Chesapeake City.

(f) Projections from vessels. No vessel carrying a deck load which overhangs or projects beyond the sides of the vessel will be permitted to enter or pass through the waterway. Vessels carrying rods, poles, or other gear extending above the top of the vessel's mast will be required to lower such equipment to a level with the top of the mast before entering the waterway.

(g) (Reserved)

(h) Tows–(1) Integrated pusher-type tows. The maxi-

mum overall length and extreme breadth of this type of tow which may transit the canal are as described in rules governing traffic through the waterway issued by the District Engineer.

(2) All other types of tows. All ships or tugs engaged in towing vessels not equipped with a rudder, whether light or loaded, shall use two towlines or a bridle on one towline. If the vessel in tow is equipped with a rudder, one towline without a bridle may be used. All towlines must be hauled as short as practicable for safe handling of the tows. No towboat will be permitted to enter the waterway with more than two loaded, or three light barges. Two or more barges or other vessels, not self-propelled, shall be towed abreast and not in tandem, using two towlines unless the towboat is made fast alongside the tow.

(i) (Reserved)

(j) Traffic lights. Traffic lights are located at Reedy Point and Old Town Point Wharf. These traffic lights are described in the rules governing traffic through the waterway issued by the District Engineer.

(k) Drawbridges. Operation of the Penn Central vertical lift bridge across the canal will be in accordance with regulations promulgated by the U.S. Coast Guard. (See **117.1 through 117.59 and 117.235**, chapter 2, for drawbridge regulations.)

(l) (Reserved)

(m) Refuse and oil. The depositing of trash, refuse, debris, oil, or other material in the waterway or upon the banks or right-of-way is prohibited. Violators are subject to penalties as prescribed by Federal law.

(n) Damage to waterway property. Damage to the waterway, lands, banks, bridges, jetties, piers, fences, buildings, trees, telephone lines, lighting structures, or any other property of the United States pertaining to the waterway is prohibited.

(o) Fish and game. The fish and game laws of the United States and of the States of Delaware and Maryland, within their respective bounds, will be enforced upon the waters and lands pertaining to the waterway owned by the United States.

(p) Grounded, wrecked, or damaged vessels. In the event a vessel is grounded or wrecked in the waterway or is damaged by accident or successive mechanical breakdown, the owner, agent, or operator shall take prompt action to prevent the vessel from becoming or remaining an obstruction to navigation, and such persons shall also respond to such instructions as may be issued by the District Engineer to prevent the vessel from becoming or remaining a menace to navigation. The lack of reasonable response from owner, agent, or operator may be deemed sufficient cause for the District Engineer to undertake repair or removal of the vessel as he may determine to be in the best interest to the Government.

(q) Commercial statistics. Owners, designated agents, or pilots of vessels transiting the waterway will furnish the District Engineer statistics on passengers, freight, and vessel data as described in the rules governing traffic through the waterway issued by the District Engineer. Failure of owners, agents, or pilots to submit these reports may result in suspension of the privilege to use the canal.

(r) (Reserved)

(s) (Reserved)

(t) Pilotage. Any pilot who pilots in the canal shall comply with State laws or Coast Guard regulations and must be licensed for this waterway by the U.S. Coast Guard.

(u) Vessels difficult to handle. Vessels which are observed by the pilot or master in charge, to be difficult to handle, or which are known to have handled badly on previous trips, must transit the canal during daylight hours and must have tug assistance. Such vessels must obtain permission from the dispatcher to enter the canal and must be provided with the number of tugs sufficient to afford safe passage. Agents must make their own arrangements for tug assistance. Such eastbound vessels must clear Reedy Point Bridge, and such westbound vessels the Chesapeake City Bridge, before dark.

Local Regulations.–1. The following rules governing traffic through the Chesapeake and Delaware Canal are issued to supplement the rules and regulations governing the use, administration, and navigation of the waterway which were prescribed by the Secretary of the Army. These rules were effective 8 August 1975, and were amended effective 1 April 1985. Copies of the approved rules and regulations may be obtained from the District Engineer.

2. Traffic through the canal is monitored by the dispatcher at Chesapeake City. Vessels transiting the canal are subject to the following rules:

a. The maximum overall length of self-propelled vessels which may transit the canal is 886 feet. Those exceeding 760 feet are required to have a bow thruster. The maximum overall length of tugs and tows which may transit the canal is 760 feet.

b. The maximum combined extreme breadth of vessels, tugs and tows meeting and overtaking each other anywhere between Reedy Point and Town Point, is 190 feet.

c. Vessels, tugs and tows, or any combination thereof, are required to have radiotelephone equipment as specified by the Vessel Bridge-to-Bridge Radiotelephone Act (Public Law 92–63). The radio requirement applies to the following:

(1) Every power-driven vessel of three hundred gross tons and upward.

(2) Every vessel of one hundred gross tons and upward carrying one or more passengers for hire.

(3) Every towing vessel of twenty six feet or over in length.

d. Vessels listed in 2.c. above will not enter the Canal until a radio communication is established with the dispatcher at Chesapeake City and a clearance to enter the Canal is received. Pilots or shipmasters will acknowledge receiving such a clearance. Radio communication shall be established on channel 13. The dispatcher at Chesapeake City monitors Channel 16 for the purpose of responding to transmissions of emergency nature. All communications with the dispatcher on these frequencies shall be confined to that necessary to transit the Chesapeake and Delaware Canal.

e. A westbound vessel must be able to pass either Pea Patch Island or Reedy Island within 1 hour after receipt of clearance. An eastbound vessel must be able to pass Arnold Point within 1 hour of receipt of clearance. A clearance to enter the canal becomes invalid and a new one must be solicited whenever the pilot or shipmaster determines that the passage at these check points will not be made within 1 hour after the dispatcher has given a clearance to enter the Canal. The dispatcher will be furnished the actual time of passing these check points, along with the estimated time of arrival at Town Point or Reedy Point. A vessel entering or departing the Canal must also report to the dispatcher the time of passing the outer end of the jetties at Reedy Point and Old Town Point Wharf.

f. A clearance by the dispatcher for a vessel's passage through the waterway shall not relieve the owners, agents, and operators of the vessel of full responsibility of its safe passage.

3. The traffic controls located at Reedy Point and Old

Town Point Wharf consist of a flashing green light when the Canal is open and a flashing red light when it is closed.

4. Vessel monitoring is performed by TV cameras, located at Reedy Point, Old Town Point Wharf. and the Conrail Railroad Bridge. These cameras are remotely controlled and monitored by the dispatcher at Chesapeake City.

5. Owners, designated agents, or pilots of vessels transiting the Canal will furnish statistical data on cargo and passengers by completing Waterway Traffic Report, ENG 3102-R, which will be mailed or delivered to the Philadelphia District Engineer. This form may be obtained from the District Engineer or the Superintendent of Operations and Maintenance, Chesapeake and Delaware Canal, at Chesapeake City.

6. Vessel operators are warned that failure to comply with the rules and regulations governing traffic through the Canal will result in referral of violations to the U.S. Coast Guard.

Supplemental Local Regulations.-The following rules regarding transit of dead ships or other structures not normally under tow through the Chesapeake and Delaware Canal are issued to supplement the rules and regulations governing the use, administration and navigation of the waterway which are prescribed by the Secretary of the Army.

These regulations appeared in a Notice to Mariners issued by District Engineer, Philadelphia District dated August 14, 1986, and were effective immediately.

All dead and disabled ships, drydocks and all other structures not normally under tow must obtain specific advance approval to transit the waterway in accordance with this notice.

Minimum requirements for these transits are as follows:

(1) First class pilot or towing vessel operator, licensed by U.S. Coast Guard, with minimum experience of 10 previous trips through the C&D Canal, including one trip within the past year, will be on board to supervise transit.

(2) Tugboat Assistance.

(a) Vessels (structures) up to 350 feet in length: minimum 1 tug with at least 1,500 hp.

(b) Vessels (structures) between 350 feet and 550 feet in length: minimum 2 tugs with at least 3,000 total hp.

(c) Vessels (structures) between 550 feet and 760 feet in length: minimum 3 tugs with at least 6,000 total hp.

Request for transit approval must be received by Chief, Operations Division at least 72 hours prior to desired transit time. Initial requests may be written or verbal. Verbal requests will be confirmed in writing. All requests will provide the following information:

(1) The name and type of dead ship or structure, its length, width, height and draft.

(2) The number, horsepower and configuration of towing vessel(s), including the length of any towing lines (hawsers) to be used.

(3) Specific details regarding any characteristic(s) of the subject ship/structure which may impact on handling during transit through the Canal.

(4) Name and telephone number of point of contact.

Approval, if granted will be given for one transit on a specific date, during daylight hours, with no vessels overtaking or passing in opposite direction. All other rules and regulations governing transit of the Canal will remain in effect.

Channels.-The Federal project for the canal provides for a channel 35 feet deep and 450 feet wide. (See Notice to Mariners and latest edition of the chart for latest controlling depths.)

The **Delaware City Branch Channel** extends northward from the canal at Mile 2.5 for 1.5 miles to the Delaware River at Delaware City. In August 1983, the controlling depth was 6 feet in the channel. In 1975, shoaling to bare was reported on the east side of the channel at the intersection with the Chesapeake and Delaware Canal. A submerged pile was reported on the west side of the channel. Delaware City Branch Channel entrance channel at the intersection with Delaware River shoals rapidly along both sides; caution is advised.

A highway bridge over the Delaware City Branch Channel about 1 mile northward of the canal has a bascule span with a clearance of 6 feet; the span is kept in a closed position and need not be opened for the passage of vessels. The overhead power and telephone cables just south of the bridge have a clearance of 30 feet; an overhead power cable 500 feet north of the bridge has a clearance of 64 feet.

Delaware City has been described in chapter 6.

Anchorages.-An anchorage basin is provided on the south side of the canal at Mile 12.8, opposite Chesapeake City. The entrance to the basin is subject to periodic shoaling. In June 1985, a depth of 3 to 5 feet was in the entrance; and thence, a depth of 5 to 7 feet was inside the basin. Free wharfage is available at the Government wharf on the west side of the basin.

Regulations for the use of the anchorage and mooring basin are given in **207.100(e)** provided previously in this chapter.

A **special anchorage,** with depths of 3 to 4 feet, is on the southeast side of the canal at Mile 16.3, northeastward of Courthouse Point. (See **110.1** and **110.70,** chapter 2, for limits and regulations.)

Local magnetic disturbance.-Differences of as much as 6° from the normal variation have been observed in Elk River Channel from Courthouse Point to Old Town Point.

Bridges and cables.-The canal is crossed by a vertical-lift bridge and four high-level fixed bridges. The fixed highway bridge at Mile 1.6 has a clearance of 135 feet. An overhead power cable with a clearance of 161 feet crosses the canal at Mile 3.5. The fixed highway bridge at St. Georges, Mile 5.0, has a clearance of 135 feet.

The ConRail Bridge across the canal at **Canal Station,** Mile 7.5, has a vertical-lift span with a clearance of 45 feet down and 133 feet up. (See **117.1 through 117.59 and 117.235,** chapter 2, for drawbridge regulations.) The overhead pipeline 1 mile west of the bridge at Mile 8.5 has a clearance of 140 feet, and an overhead power cable about 150 yards westward has a clearance of 159 feet.

The fixed highway bridge just west of the town of **Summit Bridge,** at Mile 9.2, has a clearance of 135 feet. Overhead power cables between this bridge and Chesapeake City have minimum clearances of 157 feet.

The fixed highway bridge at **Chesapeake City,** Mile 13.0, has a clearance of 135 feet.

Tides.-The mean range of tide is 5.5 feet at the Delaware River end of the canal and 2.7 feet at Chesapeake City. High and low waters in Delaware River are about 2 hours later than in Elk River. The heights of high and low waters are greatly affected by the winds; northeast storms raise the level and westerly storms lower it. (See the Tide Tables for daily predictions for Reedy Point.)

Staff gages, with zeros set at **canal datum,** are at numerous places along the canal and at both ends. The datum is 2 feet below local mean low water at the mouth of Back Creek and about ½ foot below at Delaware River.

Currents.-The current velocity is 2.6 knots on the flood and 2.1 knots on the ebb at the Reedy Point bridge, and about 2 knots at the Chesapeake City bridge. The flood sets eastward and the ebb westward. (See the Tidal Current

Tables for daily predictions for Chesapeake City.) Storms may increase these velocities to 3.0 knots or more; at such times, tows usually have dificulty in making headway against the current.

Ice sufficient to interfere with the navigation of small craft may be expected at any time between December and April and is worst during January and February. The canal is kept open as long as possible. During mild winters, local vessels use the canal throughout most of the season, but strangers should make inquiries before attempting passage. Wooden vessels passing through thin ice are liable to be cut through at the waterline. Vessels with low horsepower are cautioned against transiting the canal in heavy ice.

During ice navigation season, the Chesapeake and Delaware Canal is a **Regulated Navigation Area.** (See **165.503,** chapter 2, for regulations.)

Pilotage through the canal from Delaware River to Chesapeake City is provided by the Pilots' Association for the Delaware Bay and River. (See chapter 6.) Pilotage from Chesapeake City to Maryland ports and to Washington, D.C., is provided by the Association of Maryland Pilots. (See chapter 15.) Both pilots associations maintain a common station on the north bank of the canal at Chesapeake City. A white motor launch is used for exchanging pilots at Chesapeake City. Vessels proceeding from Chesapeake City to Washington, D.C. or the lower part of Chesapeake Bay, when using Maryland pilots, sometimes transfer pilots at a designated transfer area in Chesapeake Bay off the entrance to Patuxent River or on the Potomac River off Piney Point, depending on the port of call.

The Maryland pilots are replaced by pilots of the Virginia Pilots Association off the mouth of Severn River (approach to Annapolis, Md.) by prearrangements made well in advance when vessels proceed to Virginia ports.

The Chesapeake and Interstate Pilots Association offers pilot services to U.S. vessels, engaged in the coastwise trade, and to public vessels transiting the Chesapeake and Delaware Canal. Pilots will meet vessels upon prior notice at certain ports in the northeast, Cape Henlopen, any port or place on the Delaware Bay and River, or any port or place on the Chesapeake Bay and its tributaries and provide all pilot services required when vessels use the canal. Arrangements for pilot services are made in advance through ships' agents or the pilot office in Norfolk (telephone, 804-855-2733; cable, CINPILOT).

The Association of East Coast Pilots offers pilotage to public vessels and U.S. vessels in the coastwise trade transiting through the Chesapeake and Delaware Canal to Baltimore and Philadelphia. (See Pilotage, chapter 6.)

All pilots carry radiotelephones for bridge-to-bridge communications and for communications with the canal traffic dispatcher at Chesapeake City. Delaware Bay and River pilots use VHF-FM channel 14, and the Maryland pilots use VHF-FM channel 11; all associations use VHF-FM channel 13.

The traffic dispatcher at Chesapeake City also monitors VHF-FM channel 16 and channel 13 on a 24-hour basis.

Supplies and repairs.–Small vessels can obtain berths, gasoline, diesel fuel, and some marine supplies at Chesapeake City. The principal wharves and slips have depths of 7 to 17 feet reported at their faces.

At Mile 16.2, 0.4 mile eastward of **Courthouse Point,** a privately marked channel leads to a marina. In July 1979, the channel had a reported controlling depth of 2 feet. Berths, gasoline, and marine supplies are available. Hull and engine repairs can be made; a 20-ton mobile hoist is available. A boatyard on Courthouse Point has gasoline and a 6-ton lift; minor hull and engine repairs can be made.

(For discussion of Elk River and the upper part of Chesapeake Bay, see chapter 15.)

8. DELAWARE–MARYLAND–VIRGINIA COAST

This chapter describes that section of the Delaware, Maryland, and Virginia coastline extending from Cape Henlopen to Cape Charles and the Virginia Inside Passage. Included in the discussion are Roosevelt Inlet, the Delaware Bay entrance to the Lewes and Rehoboth Canal, Indian River Inlet, Assawoman Canal and Bay, Isle of Wight Bay, Ocean City Inlet, Chincoteague Bay and Inlet, and the various inlets that lead through the barrier beach to the Virginia Inside Passage.

Also described are the cities of Lewes, Rehoboth, Ocean City, and Chincoteague, and several of the smaller communities on these waterways.

COLREGS Demarcation Lines.–The lines established for Delaware Bay and the inlets of the Delaware-Maryland-Virginia coast are described in **80.325 and 80.505,** chapter 2.

Charts 12210, 12211, 12214, 12221.–The coast extends southward for 21 miles from Cape Henlopen to the Delaware-Maryland boundary line, thence south-southwestward for 27 miles to the Maryland-Virginia boundary, and thence 63 miles to Cape Charles. The low sand beaches are backed by bays, rivers, and creeks which are bordered by marsh and woodland. Broken ground fringes the coast, and depths of 36 feet or less are found as far as 12 miles from shore.

Visible from seaward are the summer resorts of Rehoboth Beach, Bethany Beach, Dewey Beach, and Ocean City, all within 30 miles of Cape Henlopen. The most prominent marks south of Ocean City are the light structures and the Coast Guard stations.

The bays and connecting channels back of the barrier beaches form a continuous inside passage from Delaware Bay to Chesapeake Bay, but Assawoman Canal and Little Assawoman Bay are now navigable only for rowboats and outboards.

There are no harbors of refuge for deep-draft vessels along this coast. The inlets are subject to frequent change, and their navigation requires local knowledge.

Fishtrap areas along the coast from Cape Henlopen to Cape Charles have been established under Federal authority and are shown on the charts. Numerous pile remains of former traps are said to menace inshore navigation.

Navigational aids.–Most of the navigable inlets are marked by buoys, but the channels shift and the buoys cannot always be depended upon to mark the best water. Breakers form on the shoals even in ordinary weather and are good marks. Some of the interior channels are marked by daybeacons and lights, but others are marked only by bush stakes. The channels through the flats can be followed best at low water when the flats are visible.

Tides.–The mean range of tide varies from 2.7 to 4.4 feet along the coast; high and low waters occur at about the same time as at Sandy Hook. Levels in the inside waters are greatly affected by winds, westerly winds producing low water and easterly winds high water. In Assawoman, Isle of Wight, Sinepuxent, and Chincoteague Bays, northerly and southerly winds drive the water to the ends of the bays. With strong winds of long duration, depths may be as much as 3 feet above or below the normal level.

Currents.–The currents have considerable velocity in the inlets and in the narrow channels connecting the inlets with adjacent bays and sounds. Velocities of as much as 3 knots may be encountered at times in places where the currents are strongest.

Weather.–From Cape Henlopen to Cape Charles this coast is exposed to the rigors of the North Atlantic. Winter gales can be expected about 5 percent of the time while winds of 28 knots or more are twice as frequent. Strongest and most prevalent are those out of the northwest through north, averaging 18 to 20 knots. Wave heights of 10 feet or more are encountered 8 to 12 percent of the time from December through March. Winter visibilities suffer from precipitation and fog; visibilities fall below 2 miles about 3 percent of the time and below 0.5 mile, 1 to 2 percent of the time. Precipitation occurs about 8 percent of the time.

Spring brings milder conditions. Gales and wind speeds of 28 knots or more occur about one-half as frequently as they did in winter. Directions are variable, but south and southwest winds are most frequent by April. Waves of 10 feet or more become increasingly less frequent; by May they are encountered less than 3 percent of the time. However, warm air blowing over still cold water brings fog. Visibilities of less than 0.5 mile occur about 3 percent of the time; about one-half that of visibilities less than 2 miles. Precipitation occurs about 6 percent of the time.

Summer, except for the threat of thunderstorms and a rare tropical cyclone, brings good sailing weather. Winds are out of the south and southwest about one-half of the time; westerlies and northeasterlies are also common. Strong winds are unlikely outside of thunderstorms, tropical cyclones, and an occasional frontal passage. Poor visibilities are also uncommon and waves of 10 feet or more occur 1 to 2 percent of the time. Precipitation is encountered about 4 percent of the time and about one-half the time is in the form of thunderstorms. Thunderstorms are most likely from May through September and often occur during the late night and early morning hours at sea. In squall lines winds can reach hurricane force in gusts.

With autumn, comes more of a threat of both tropical and extratropical storms, variable, strong winds and rough seas. Tropical cyclones are a threat throughout the fall, but particularly in September and October when recurving storms tend to brush this coast on occasion. Extratropical storms pick up in October and are partially responsible for the increase in northerlies and northwesterlies. Winds out of the east, southwest and northwest are also common. In October, gales occur about 2 percent of the time compared to winds of 28 knots or more, which are encountered about 6 percent of the time. Wave heights of 10 feet or more are generated 7 to 8 percent of the time during autumn. At sea visibilities remain good; less than 0.5 mile less than 1 percent of the time, while less than 2 miles about 2 percent of the time. Precipitation falls about 5 percent of the time.

Ice.–The inside waters north of Chincoteague Bay occasionally are closed by ice during ordinary winters. The tributary waters south of the bay are closed during severe winters, but remain so only for short periods. The principal inlets are rarely closed and are used by local boats throughout the winter.

During the ice navigation season, the inside waters of Maryland, described in this chapter, are a **Regulated Navigation Area.** (See **165.10, 165.33 and 165.503,** chapter 2, for limits and regulations.)

Chart 12216.–Cape Henlopen, on the southwest side of the entrance to Delaware Bay, is described in chapter 6.

Roosevelt Inlet, 3 miles west of Cape Henlopen, is the

Delaware Bay entrance to the Lewes and Rehoboth Canal and to Broadkill River. The inlet is protected by jetties that are awash at low water; each jetty is marked by a light on its outer end; a fog signal operates at the southeast light. The channel is marked by the jetty lights and a **213°** lighted range. The mean range of tide is 4.4 feet in Roosevelt Inlet; the current velocity is about 0.9 knot. In January 1986, the controlling depth in the dredged entrance channel between the jetties was 4 feet. Gasoline and diesel fuel can be obtained at a yacht club on the northeast side of the inlet.

Broadkill River is entered by way of an inside passage that extends northwestward for 2 miles from the Roosevelt Inlet jetties to the old mouth of the river; the river then extends 9 miles westward to the town of **Milton.** In April 1979, the centerline controlling depths were 7½ feet from the junction with Roosevelt Inlet to about 1.8 miles above the inlet, thence in 1978, 1 foot on the centerline to Milton.

Twin fixed highway bridges over Broadkill River have a clearance of 18 feet. The overhead power cable just northwestward of the bridges has a clearance of 64 feet. Above the bridges, the river has numerous snags and much floating debris.

The **Lewes and Rehoboth Canal** is a tidal waterway that extends southeastward and southward for 8 miles from Roosevelt Inlet to Rehoboth Bay. The canal passes northeastward of Lewes and westward of Rehoboth Beach; the entrance to Rehoboth Bay is between stone jetties a mile southwest of Dewey Beach. The mean range of tide in the canal is 3.6 feet at Lewes and 0.5 foot at Rehoboth Beach. In January 1986, the controlling depth was 4 feet in the Roosevelt Inlet channel, then in May 1986, 5 feet at midchannel to the turning basin, with depths of 4 to 8 feet in the middle part of the basin, and then in September 1984, 4 feet on the centerline to Rehoboth Bay. The posted **speed limit** is 4 miles per hour in the canal.

Lewes, 1.7 miles inside Roosevelt Inlet, has rail connections and is the southern terminal for the Cape May-Lewes ferry.

Several small-craft facilities are in the vicinity of the first and second bridges at Lewes. Gasoline, diesel fuel, berths, and marine supplies can be obtained, and hull and engine repairs can be made. A 70-foot marine railway and a 25-ton mobile hoist are available.

Bridges and cables.–The U.S. Route 9 Business highway bridge over the canal at Lewes has a 46-foot bascule span with a clearance of 6 feet. In 1983, the highway bridge was being reconstructed; upon completion the vertical clearance will be at least 15 feet. The overhead power cable to the west of the bridge has a clearance of 68 feet. The Delaware Coast Line railroad bridge, 0.2 mile southeastward of the highway bridge, has a 46-foot swing span with a clearance of 10 feet; the span remains in the open position except for infrequent passage of trains; the overhead cable at the bridge has a clearance of 68 feet. The U.S. Route 9 fixed highway bridge 100 yards southeastward of the railroad bridge has a 46-foot span with a clearance of 35 feet.

These bridges restrict the normal water flow in the canal and produce very strong currents. Small craft should proceed with caution in these areas.

The State Route 1 Alternate highway bridge over the canal at Rehoboth Beach, 6.5 miles from Roosevelt Inlet, has a 49-foot bascule span with a clearance of 16 feet; the overhead power cables on the north side of the bridge have a least clearance of 70 feet. In 1984, a temporary fixed highway bridge with design clearances of 22 feet vertical and 48 feet horizontal was under construction just north of the existing bascule highway bridge which is being renovated. The temporary bridge will be removed when renovations are completed. The design clearance of the new bascule highway bridge is 16 feet. The State Route 1 highway bridge, 0.3 mile farther southward, has a bascule span with a clearance of 14 feet; the overhead power cables on the south side of the bridge have a least clearance of 55 feet. In 1980, a dual fixed highway bridge with a design clearance of 35 feet was under construction just south of the State Route 1 bascule bridge at Rehoboth Beach. Upon completion it will replace the existing bascule bridge. (See **117.1 through 117.59 and 117.239,** chapter 2, for drawbridge regulations.)

A yacht club at which slips, gasoline, and some marine supplies are available is in a basin on the east side of the canal 4 miles southeastward of Lewes.

Rehoboth Bay has depths of 1 to 7 feet. The 5-mile route down Rehoboth Bay from the Lewes and Rehoboth Canal to Indian River Bay is marked by lighted and unlighted buoys, lights, and daybeacons. Reported depths of 5 feet can be carried through the marked-bay channel to near Light 9, thence in March-June 1980, 4½ feet in the dredged section of the channel which leads between the islands separating the two bays. In 1983, shoaling to an unknown extent was reported in the dredged section of the channel in about 38°38′19″N., 75°06′15″W. Gasoline, some supplies, and slips are available at the northeast end of Rehoboth Bay at **Dewey Beach.**

Love Creek, at the northwest corner of Rehoboth Bay, is navigable for small craft to a milldam near **Robinsonville,** 4 miles above the mouth. An unmarked, privately dredged channel leads from Rehoboth Bay to about 3 miles above the mouth of the creek. In June 1979, the channel had a reported controlling depth of 3 feet. The fixed highway bridge 2.3 miles above the mouth has an 18-foot channel span with a clearance of 7 feet. Above the bridge are berthing facilities in depths of 1 to 2 feet.

Herring Creek, at the southwest corner of Rehoboth Bay, has depths of 3 to 5 feet to the forks 2 miles above the mouth, thence 1 to 3 feet for 0.5 mile up the northern prong and 3 to 5 feet for 1 mile up the southern prong. The creek, partially marked by private buoys, is little used except by local residents.

Indian River Inlet, 12 miles south of Cape Henlopen, is the first opening in the barrier beach south of Delaware Bay. The entrance is marked by buoys, and a light is on the end of the south jetty. **Indian River Inlet Coast Guard Station** is on the north side 0.5 mile inside the inlet; a radiobeacon is at the station. **Storm warning signals are displayed.** (See chart.)

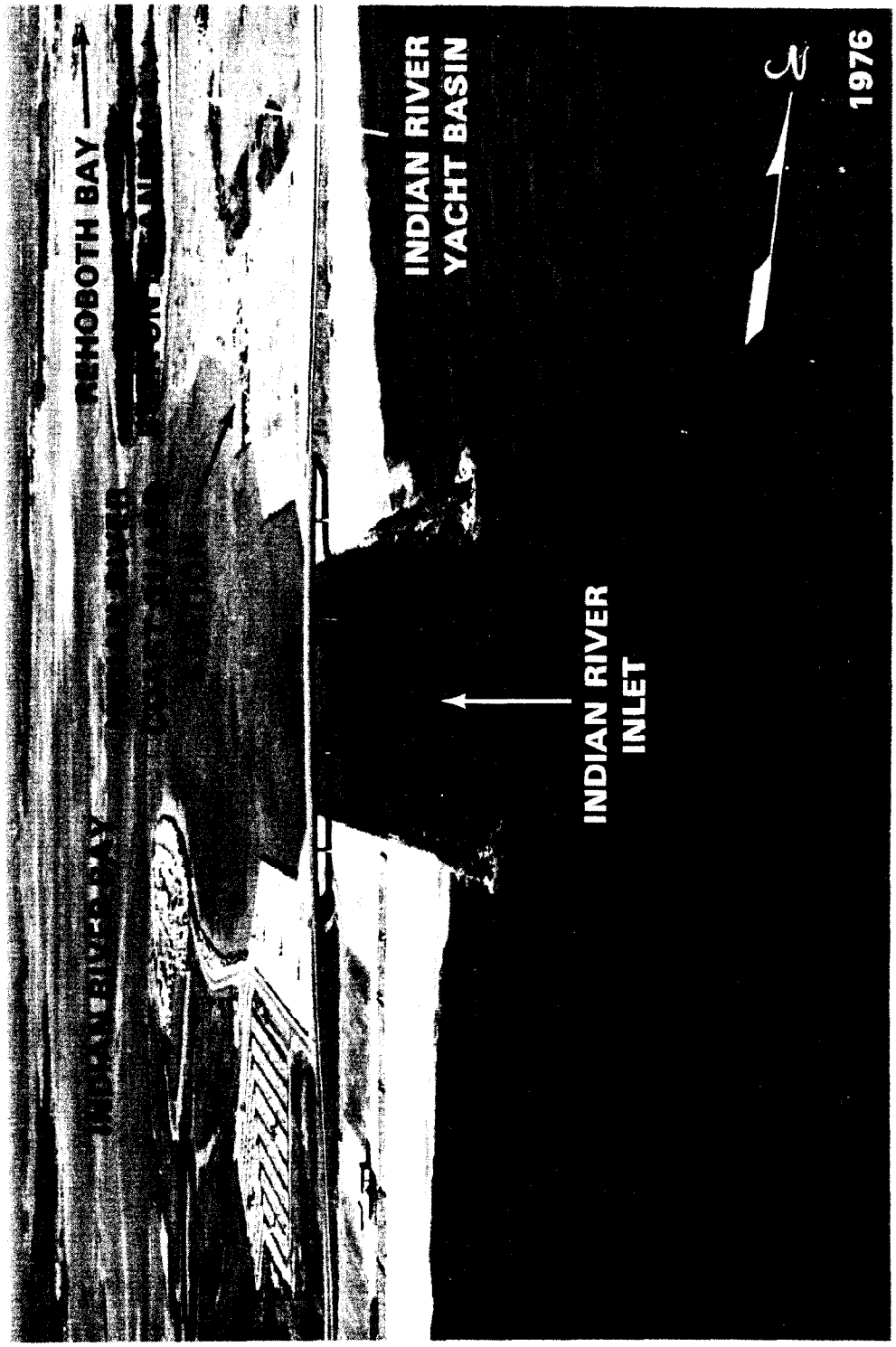
A channel leads from Indian River Inlet through Indian River Bay and up Indian River to Millsboro, 12 miles above the inlet. In 1977, the controlling depth was 11 feet through the dredged entrance channel between the jetties to a point about 0.9 mile west of the fixed bridge; thence in 1980-1983, 3½ feet to Daybeacon 50; thence in November 1987, a reported controlling depth of 2 feet was available to Millsboro. Buoys mark the shifting channel between the entrance and the junction light, and daybeacons mark the channel to Millsboro.

The mean range of tide is 2.7 feet at the highway bridge over the inlet. The current velocity is about 2 knots; caution is necessary, because the buoys sometimes tow under.

The fixed highway bridge over Indian River Inlet has a clearance of 35 feet for a midwidth of 100 feet or 32 feet for a width of 200 feet. The stub ends of a former drawbridge, now used as fishing piers, are close westward of the bridge. An overhead power cable with a clearance of 105 feet crosses the inlet about 100 yards westward of the bridge.

Gasoline, diesel fuel, slips, and some marine supplies are available in the small-boat basin on the north side, 0.8 mile

INDIAN RIVER INLET, DELAWARE



inside Indian River Inlet, and at a marina on the south side 0.9 mile inside the inlet. Hull and engine repairs can be made at both facilities. The boat basin has a 10-ton lift, and the marina a 25-ton lift.

A **special anchorage** is on the south side of Indian River Inlet 1.2 miles above the jetties. (See **110.1** and **110.65**, chapter 2, for limits and regulations.)

Indian River Bay, a shallow lagoon with depths of 1 to 6 feet, extends for about 5 miles west of Indian River Inlet, then becomes **Indian River,** which is navigable for an additional 7 miles to Millsboro. The 5-mile route down the bay from Rehoboth Bay to Assawoman Canal is marked by seasonal buoys and daybeacons; the controlling depth is about 2 feet.

The State of Delaware has established State-leased clam and oyster grounds, which extend westward from a line connecting Lingo Point (38°36.4′N., 75°09.4′W.) and Ellis Point (38°35.6′N., 75°08.1′W.) to Daybeacon 30 at the entrance to Indian River and Daybeacon 4 inside Pepper Creek. Mariners are advised to use caution when navigating outside the marked channel in this area because of numerous unlighted stakes, wood spar buoys, and other dangerous markers.

Pepper Creek, on the south side of Indian River Bay near its western end, has a dredged channel marked by daybeacons extending for 3 miles above the entrance. In 1983, the reported centerline controlling depths were 4½ feet to Daybeacon 12, thence 3½ feet to Daybeacon 13. A clam plant is at the upper end of the creek. Gasoline and slips are available 2 miles above the entrance.

Most of the piers and facilities on the north side of Indian River are private.

An overhead power cable with a clearance of 61 feet was reported about 3.5 miles above the entrance to the river.

Millsboro, on the south side of Indian River at the head of navigation, has a town bulkhead; gasoline and some supplies are available. About 100 yards below the causeway at Millsboro, there is an overhead power cable with a clearance of 43 feet. The town has railroad-freight service.

White Creek is on the south side of Indian River Bay 1.5 miles back of the outer beach. A 2-foot channel marked by seasonal buoys and daybeacons passes through the bay and creek to Assawoman Canal and **Ocean View** where gasoline and some supplies are available.

Chart 12214.–Assawoman Canal, a 3-mile land cut that connects White Creek with the north end of Little Assawoman Bay, had a reported controlling depth of ½ foot in June 1977. Logs were reported to obstruct the channel at several points. Three fixed highway bridges over the canal have a minimum width of 14 feet and clearance of 4 feet. The power cables over the canal have a clearance of 28 feet.

Little Assawoman Bay, behind the barrier beach of **Fenwick Island,** is 3 miles long. The bay has depths of 2 to 4 feet in some places, but is bare in others and is seldom used. The only route markings are stakes set by local residents.

Chart 12211.–Fenwick Island Light (38°27.1′N., 75°03.3′W.), 83 feet above the water, is shown from a white tower, about 0.3 mile back of the beach. The tower, just north of the Delaware-Maryland boundary line, is 9 miles south of Indian River Inlet and 21 miles south of Cape Henlopen.

Fenwick Shoal, about 5.5 miles eastward of the northern end of Fenwick Island, has a least depth of 14 feet, but the westerly of two wrecks near the crest of the shoal is covered only 6 feet. A lighted gong buoy marks the southwest end of the shoal.

Isle of Wight Shoal, about 8.5 miles northeastward of Ocean City Inlet, has a depth of 21 feet and is marked on its west side by a buoy. A 24-foot shoal is about midway between Isle of Wight Shoal and Fenwick Shoal.

A narrow thoroughfare links the southern end of Little Assawoman Bay with Assawoman Bay; the controlling depth is about 2 feet. It is navigable by small boats with local knowledge. The fixed highway bridge near the north end of the thorofare has a width of 37 feet and a clearance of 11 feet.

Assawoman Bay and **Isle of Wight Bay** form a continuous lagoon that extends from close southward of Little Assawoman Bay to Ocean City. The bays have depths of 4 to 6 feet along their western sides, and are frequented by boats from Ocean City.

The State Route 90 fixed highway bridge with a clearance of 35 feet crosses Isle of Wight Bay between Isle of Wight and Fenwick Island.

Ocean City Inlet (38°19.4′N., 75°05.2′W.), between Fenwick Island and Assateague Island, is 29 miles south of Cape Henlopen and is the only break in the barrier beach between Indian River Inlet and Chincoteague Inlet. The entrance is between stone jetties, but the north jetty and the outer end of the south jetty are covered at high water. In October 1983, the south jetty was undergoing reconstruction and two detached breakwaters in line close westward in Ocean City Inlet were under construction; construction is scheduled for completion in October 1985. A 200-foot-long fishing pier is 0.2 mile north of the north jetty. **Ocean City Coast Guard Station** is 0.6 mile inside the inlet on the southwest side of Ocean City. **Storm warning signals are displayed.** (See chart.)

Little Gull Bank, 2.5 miles southeastward of Ocean City Inlet, has a depth of 15 feet and is marked at its southwest end by a buoy. **Great Gull Bank,** 5 miles southeastward of the inlet, has a depth of 17 feet at its southwest end and is marked at its northern end by a lighted whistle buoy.

Ocean City, that part of Fenwick Island barrier beach in Maryland, is a large summer resort visited by many small boats and is a shipping point for a large amount of seafood.

Ocean City Inlet is subject to continual change. A dredged channel leads westward from the west end of the entrance jetties to the head of Commercial Fish Harbor. In 1980-February 1981, the controlling depth was 12 feet to the head of the harbor. Another dredged channel leads northward from inside the inlet along the inner side of Ocean City to the middle of Isle of Wight Bay. In 1976, the midchannel controlling depth was 6 feet to Isle of Wight Bay Channel Light 2. Between Light 2 and deep water in the northern part of Isle of Wight Bay is a shoal area where the buoys are periodically moved to mark the best water; caution is advised.

The entrance to Ocean City Inlet is marked by a light and fog signal near the outer end of the north jetty, a radiobeacon atop the tower inshore, and lighted buoys that are shifted in position with changing channel conditions. During the summer months fishing vessels anchor at the entrance to the inlet near the north and south jetties. Within the inlet a strong ebb current exists. Caution is advised when entering and transiting the inlet. The mean range of tide is 3.4 feet.

A large, cylindrical water tank, about 1.5 miles west of Ocean City Inlet, is prominent and is a good landmark while entering the inlet.

Lights, lighted and unlighted buoys, and a daybeacon mark the channel to Isle of Wight Bay.

The U.S. Route 50 highway bridge over Isle of Wight Bay from the mainland to Ocean City, 0.9 mile above the

entrance jetties, has a bascule span with a clearance of 18 feet. The bridgetender monitors VHF-FM channel 16 and works on channels 13, and 68; call sign KYU-698.) (See **117.1 through 117.59 and 117.559,** chapter 2, for drawbridge regulations.) Pile remains of an abandoned highway bridge are 0.2 mile south of the bridge.

There are numerous privately owned pile and timber piers and bulkhead wharves on the inner side of Ocean City. The **Commercial Fish Harbor,** on the mainland side 1 mile directly back of the inlet, has a 1,000-foot public bulkhead landing and several private bulkhead wharves open to the public for transaction of business with the owners.

There are several small-craft facilities at Ocean City and in Commercial Fish Harbor. Gasoline, diesel fuel, water, berths, and marine supplies can be obtained at most of the facilities, and hull and engine repairs can be made at some.

Buses operate to and from Ocean City. The Baltimore and Eastern Railroad has a freight siding at the Commercial Fish Harbor.

Sinepuxent Bay, narrow and mostly shoal, and **Chincoteague Bay,** with depths of 4 to 7 feet along its western side but shoal along its eastern side, are behind **Assateague Island** and provide a 30-mile inside route for small boats from Ocean City to Chincoteague. The bays are used by fishing and pleasure boats. The Maryland-Virginia boundary line is marked by an orange and white buoy and by orange-bordered daymarks on piles. **Storm warning signals are displayed.** (See chart.)

A dredged channel, marked by lights, lighted buoys, and daybeacons, extends 12 miles through Sinepuxent Bay to open water in Chincoteague Bay where the route to Chincoteague follows lights marking the shoal areas. The controlling depths from Ocean City to Chincoteague Bay were: 6 feet to Green Point in 1972; thence 4½ feet to Daybeacon 33 in 1963-1966; thence 4 feet reported to Chincoteague Bay in May 1971. Sinepuxent Bay channel is subject to frequent shoaling, and lesser depths may be encountered. In May 1980, an obstruction was reported to be about 13 yards into the channel in the vicinity of Daybeacon 37.

A fixed highway bridge across Sinepuxent Bay has a clearance of 38 feet; the overhead cables have a least clearance of 61 feet over the dredged channel.

Public Landing (38°08.9′N., 75°17.2′W.), on the mainland side of Chincoteague Bay 15 miles from Ocean City Inlet, has a public wharf, private landings, and fish piers; all have depths of about 4 feet alongside. A highway leads westward from the landing to **Snow Hill** on Pocomoke River. A small-boat basin with depths of 3 feet and a launching ramp is entered just north of the piers.

A marina at the entrance to **Tanhouse Creek,** 1 mile south of Public Landing, has gasoline, diesel fuel, and an 8-ton mobile hoist for hauling out boats for minor hull and engine repairs. The entrance to the creek is marked by a light.

George Island Landing is a small town on the mainland 0.8 mile northward of **Purnell Point** (38°01.7′N., 75°21.6′W.). The public wharf at the town is reached from the southward from Chincoteague Bay through a private channel marked by lights and daybeacons. In 1970, depths of 5 feet were reported in the channel and alongside the wharf. An overhead power cable with a clearance of 28 feet crosses the channel near the wharf.

Greenbackville, 1.5 miles southwestward of Purnell Point, is a village on the mainland side of Chincoteague Bay just south of the Maryland-Virginia boundary line and 4 miles north of Chincoteague. The channel into the harbor, marked by lights, had a midchannel controlling depth of 5 feet in 1979-May 1983. The mean range of tide is 0.6 foot. A repair yard in the harbor has a marine railway that can handle craft up to 45 feet for minor hull and engine repairs.

The narrow dredged channel marked by lights and daybeacons, 4.5 miles south of Purnell Point, is usually used to reach Chincoteague from Chincoteague Bay. In August-September 1984, the channel had a controlling depth of 2 feet (3½ feet on the centerline). The other passages between Chincoteague Bay and Chincoteague Inlet through marshy islands west of Chincoteague Island are used only by small boats with local knowledge. Controlling depths through these passages range from 1 to 6 feet, and the fixed bridges over them have clearances of 4 to 12 feet.

Assateague Light (37°54.7′N., 75°21.4′W.), 154 feet above the water, is shown from a 142-foot red and white horizontally banded conical tower 3 miles from the south end of Assateague Island. The light stands well above the surrounding trees.

Winter Quarter Shoal, 11 miles east-northeast of Assateague Light, has depths of 10 to 17 feet, but a wreck just west of the highest part is covered only 5 feet; a buoy marks the west side of the wreck. During periods of high winds and seas, breakers have been observed over the shoal.

Blackfish Bank, about 6 miles eastward of the south end of Assateague Island, has several depths of 11 to 16 feet along its 5-mile length, and near its southwest end is a depth of 11 feet over a wreck. A bell buoy is 0.6 mile south of the wreck. A 25-foot shoal 2.5 miles east of the wreck is marked on its east side by a lighted whistle buoy. Coasting vessels seeking protection from westerly weather pass westward of Blackfish Bank. In August 1981, a wreck, covered 25 feet, was reported about 10 miles east of Blackfish Bank in about 37°52′07″N., 75°03′30″W. A possible wreck, reported covered 25 feet, is about 5 miles south-southeast of Blackfish Bank.

Chincoteague Shoals, extending about 3 miles east and south of the lower end of Assateague Island, have depths of 5 to 18 feet. An unlighted buoy and a lighted bell buoy are near the 5-fathom curve southerly of the shoals. Breakers have been observed over the 5-foot shoals when winds are southerly.

Chincoteague Inlet (see also chart 12210), between Assateague Island and Wallops Island, is 30 miles south-southwestward from Ocean City Inlet. The marked channel through the inlet to **Chincoteague Channel** is subject to frequent change; the buoys are shifted with changing conditions. Breakers are evident on either side of the channel. A sunken wreck is about 0.4 mile southwest of Fishing Point in 37°51′52″N., 75°24′03″W. Caution is advised when navigating the inlet.

Assateague Light and the lookout tower on the southern tip of Assateague Island are good marks for approaching Chincoteague Inlet.

Fishing Point, the hook-shaped sandspit forming the south side of **Toms Cove,** is continually making out to the westward, requiring caution when in the vicinity.

Chincoteague, occupying most of **Chincoteague Island,** is between the mainland and the south end of Assateague Island. The highway bridge to Chincoteague has a swing span with a clearance of 15 feet over the main channel. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) The town is principally a shellfish and fishing center, but pleasure craft operate from here during the summer. The wharves and piers along the waterfront have depths of 3 to 10 feet alongside. There are small-craft facilities at Chincoteague that can provide gasoline, diesel fuel, water, berths, and limited marine supplies. Hull and engine repairs can be made; a 40-ton marine railway at Chincoteague can handle craft up to 80 feet.

Chincoteague Coast Guard Station is on the east side of Chincoteague Channel, 0.3 mile south of the highway bridge. **Storm warning signals are displayed.** (See chart.)

Chart 12210.–The 35-mile stretch of coast between Chincoteague Inlet and Great Machipongo Inlet is formed by six islands of about equal length. The islands are separated from each other by narrow inlets and from the mainland by marsh and flats through which are numerous sloughs and channels.

Wallops Island, northernmost of the six, is on the southwest side of Chincoteague Inlet.

A **danger zone** extends for about 5 miles off the coast of Wallops Island and covers the entrance to Chincoteague Inlet. (See **334.130** chapter 2, for limits and regulations.)

Assawoman Inlet, the ocean entrance between **Wallops Island** and **Assawoman Island,** is very shallow and is not used. **Gargathy Inlet,** the ocean inlet separating Assawoman Island and **Metompkin Islands,** is not used.

Metompkin Inlet, the ocean entrance between Metompkin Islands and **Cedar Island,** is used by some small local fishing and oyster boats. The changeable entrance channel is unmarked and should not be entered without local knowledge.

Porpoise Banks, 10 miles offshore from Metompkin Inlet, have irregular bottom with depths of 34 to 40 feet.

Wachapreague Inlet, between Cedar Island and **Parramore Island,** is 20 miles south-southwestward of Chincoteague Inlet. The entrance is marked by a lighted bell buoy and unlighted buoys that are shifted in position with changing channel conditions. The controlling depth is about 5 feet through the inlet, which is used by many fishing boats and by some boats seeking shelter, but should be entered only with local knowledge. The best anchorage is in **Horseshoe Lead,** southwest of the entrance, where there are depths of 20 to 30 feet west of the middle ground. **Parramore Beach Coast Guard Station** is on the inner side of Parramore Island 0.5 mile south of the inlet. A radiobeacon is atop the lookout tower at the Coast Guard station.

Parramore Banks extend about 8 miles offshore from Wachapreague Inlet. The area is lumpy and has numerous depths of 18 to 30 feet. A lighted whistle buoy is east of the banks.

Two fish havens are about 2.6 miles and 7.5 miles east-southeast, respectively, from Wachapreague Inlet. The fish haven nearer to shore is marked by buoys.

Wachapreague, a town on the mainland about 4 miles west-northwest of Wachapreague Inlet, is an oystering and fishing center, and is a base for some pleasure boats during the summer. A depth of about 4 feet can be carried from Wachapreague Inlet through **Hummock Channel** and **Wachapreague Channel,** marked by lights, to the wharves and marinas at the town. Gasoline, diesel fuel, berths, and some marine supplies can be obtained. Hull and engine repairs can be made; largest marine railway, 50 feet.

Quinby Inlet, the ocean entrance between Parramore Island and Hog Island, has a fan of breakers across the bar at the entrance. The buoys marking the inlet are frequently shifted and not charted. In 1982, a draft of 5 feet could be carried through the inlet. The inlet should not be used without local knowledge.

Quinby is a village on the mainland about 6 miles north-northwest of Quinby Inlet. A channel to the village, marked by lights and buoys, follows **Sandy Island Channel** to **Upshur Bay,** thence through a slough in the mudflats to a dredged channel leading to a basin that has a public landing; gasoline, diesel fuel, berths, some marine supplies, and a pump-out station are available. In January 1986, the midchannel controlling depth was 2 feet in the dredged channel, then in 1980, a depth of 7 feet was in the basin. A no-wake **speed limit** is enforced.

Great Machipongo Inlet, the ocean entrance between Hog Island and **Cobb Island,** has breakers that form on the shoals on either side of the entrance at all times, but on the bar only in heavy weather. The inlet is marked by buoys that are shifted in position with changing channel conditions. The controlling depth is about 12 feet over the bar.

Great Machipongo Channel extends northwestward through Hog Island Bay from the inlet to the mainland where it continues as **Machipongo River. Willis Wharf,** on the west bank of **Parting Creek** 1 mile above the junction with Machipongo River, is a base for shellfish and fishing boats. Gasoline and diesel fuel are available. A marine railway here can handle craft up to 60 feet for do-it-yourself repairs. In June 1987, the dredged channel in Parting Creek had a midchannel controlling depth of 8 feet from the junction with Machipongo River to Willis Wharf.

A state-owned boat harbor is just below Willis Wharf on the west side of Parting Creek between Daybeacons 17 and 18. An area with about 41 slips is available for commercial fishing boats. The harbor has electricity, water, and a launching ramp.

Chart 12224.–Sand Shoal Inlet, the ocean entrance between Cobb Island and **Wreck Island,** may be entered through three channels. **Northeast Channel,** protected by extensive shoaling to northward and marked by buoys shifted in position with changing channel conditions, leads along the south end of Cobb Island; the controlling depth is about 10 feet over the bar. **Southeast Channel** is straight, but the bar breaks in heavy weather; the controlling depth is about 10 feet over the bar. **South Channel,** east of Wreck Island, has a controlling depth of about 8 feet. The latter two channels are not marked and should not be used by strangers.

A good fair-weather anchorage is in the channel near the discontinued Coast Guard station east of **Little Cobb Island** for boats able to cross the entrance bar with 3 feet over it.

Sand Shoal Channel, marked by lights and daybeacons, extends westward from Sand Shoal Inlet for 6 miles where it joins a marked dredged channel leading to the wharves and public bulkhead at **Oyster** on the mainland. In June 1984, the controlling depth was 6 feet in the dredged channel and in the basin at Oyster. Public piers and a launching ramp are on the northern side of the basin. Numerous wrecks are reported near these facilities; caution is advised.

Oyster is the shipping point for large amounts of clams and oysters. Gasoline, diesel fuel, and some marine supplies are available.

Ship Shoal Inlet, the ocean entrance between Ship Shoal Island and **Myrtle Island,** is shallow and unmarked; it is used only by local oyster boats. There is deep water back of the inlet, but the channels to the inside passages are shallow and tortuous.

The **danger zone** of a bombing and gunnery range is centered on Myrtle Island, 6 miles northeastward of Cape Charles Light. (See **334.330,** chapter 2, for limits and regulations.)

Little Inlet, between Myrtle Island and Smith Island, is shallow and is little used. Small boats can connect with the inside passage at high water.

Cape Charles and the islands on the north side of the entrance to Chesapeake Bay are described in chapter 9.

Smith Island Inlet, between Smith Island and Fishermans Island, is fairly wide, but the narrow, changeable channel lies between sandbars and breakers. The inlet is used by

many local boats with drafts of 3 to 4 feet, but it is unmarked and should not be used by strangers. The controlling depth over the bar is said to be 1½ feet.

Charts 12211, 12210, 12221.–Virginia Inside Passage is between the barrier beach along the Atlantic Ocean on the east and the Virginia portion of the mainland peninsula on the west. The passage extends 74 miles from the south end of Chincoteague Bay through creeks, thorofares, marshy cuts, and bays to enter Chesapeake Bay at Cape Charles. The route is marked with lights and daybeacons which have daymarks with white reflector borders to distinguish them from aids to navigation marking other waterways. Buoys are temporarily established from time to time to mark destroyed aids or critical places.

The Federal project depth is 6 feet for the waterway. Maintenance dredging is performed to provide a 6-foot controlling depth, but due to continuous shoaling 3 feet or less may be found in places, particularly inside the ocean inlets. The overhead clearance is limited only by the 40-foot fixed bridge across Cat Creek, 8 miles southward of Chincoteague, the 50-foot clearance of the power cable over Longboat Creek inshore from Metompkin Inlet, 22 miles southward of Chincoteague, and the 40-foot fixed bridge at Cape Charles.

The mean range of tide varies from 2.5 to 4.5 feet in the inlets along the Virginia coast; greater fluctuations in the water level in the inside waters are caused by high winds and storms.

Gasoline, diesel fuel, and some marine supplies are available at Wachapreague, 29 miles south of Chincoteague; at Quinby, 33 miles south of Chincoteague; at Willis Wharf, 37 miles south of Chincoteague; and at Oyster, 60 miles south of Chincoteague and 12 miles north of Cape Charles. Hull and engine repairs can be made at Wachapreague.

From Chincoteague, the Virginia Inside Passage follows Chincoteague Channel across Chincoteague Inlet to **Walker Point,** thence through **Balfast Narrows, Island Hole Narrows,** the dredged cut in **Bogues Bay,** and **Cat Creek** to the sloughs marked by lights and daybeacons back of Assawoman Inlet, 10 miles southwestward of Chincoteague. The fixed highway bridge over Cat Creek has a clearance of 40 feet. The overhead power cable just north of the bridge has a clearance of 60 feet.

From 1 mile back of Assawoman Inlet, the inside passage continues through **Northam Narrows,** thence through dredged cuts in **Kegotank Bay** and back of Gargathy Inlet to **Wire Passage,** 15 miles southwestward of Chincoteague.

From Gargathy Inlet, the inside passage goes through Wire Passage into a dredged cut in **Metompkin Bay,** and enters Folly Creek westward of Metompkin Inlet. A dredged channel with a controlling depth of ½ foot, in 1978, extends about 350 yards up **Parker Creek** from junction Light 2. In November 1979, the middle of the channel had shoaled to bare about 120 yards above Daybeacon 2A. The channel is marked by a light and daybeacons. **Folly Creek,** which leads westward from the south end of Metompkin Bay, has a depth of 1 foot to the landing at its head, 3 miles above the mouth. A launching ramp and a pier are on the south side of Folly Creek about 1 mile west of Light 87.

The passage continues through a dredged cut from Folly Creek into **Longboat Creek** , which has a power cable over its northern part with a clearance of 50 feet, thence through cuts in **Cedar Island Bay, Teagles Ditch,** and **Burtons Bay** into Wachapreague Channel which leads to Wachapreague, 29 miles southward of Chincoteague. Supplies and repair facilities are available at Wachapreague. (Refer to previous description in this chapter.)

From Wachapreague Channel, the passage continues through a cut in **Bradford Bay,** a part of **Millstone Creek,** a cut in **Swash Bay,** a part of **The Swash,** and **Little Sloop Channel** to Sandy Island Channel, 3 miles inside Quinby Inlet and 36 miles southward of Chincoteague.

The passage southward of Quinby Inlet follows **Sloop Channel** and a dredged cut into **Cunjer Channel,** thence westward in **North Channel** at the north end of **Hog Island Bay** to Great Machipongo Channel, 43 miles southward of Chincoteague.

After passing through Great Machipongo Channel to a point 2 miles inside Great Machipongo Inlet, the route goes westward through **Gull Marsh Channel,** thence southwestward through a natural channel and cut in **Outlet Bay** and **Spidercrab Bay** to **Eckichy Channel,** thence southeastward to Sand Shoal Channel, 1.5 miles inside Sand Shoal Inlet, 56 miles southward of Chincoteague.

From inside of Sand Shoal Inlet, the passage continues westward through Sand Shoal Channel and southward through **Mockhorn Channel** to Magothy Bay.

Magothy Bay, which extends southward from Mockhorn Channel to Smith Island Inlet, is shallow except in the well-marked inside passage which passes through the bay to Cape Charles. **Magotha** is a village on the west side of the bay 3.5 miles northwestward of Cape Charles Light.

From the southern part of Magothy Bay, the passage continues southwestward through a dredged cut across Cape Charles into the deep water in Chesapeake Bay. The fixed highway bridge over the passage from Cape Charles to Fishermans Island has a clearance of 40 feet.

9. CHESAPEAKE BAY ENTRANCE

This chapter describes the deep-draft southerly entrance to Chesapeake Bay from the Atlantic Ocean; the waters of Lynnhaven Roads, Lynnhaven Inlet, Little Creek, Hampton Roads, Willoughby Bay, Lafayette River, and Elizabeth River, including Western, Eastern, and Southern Branches; and the ports of Hampton, Newport News, Norfolk, Berkley, Portsmouth, and Chesapeake.

COLREGS Demarcation Lines.–The lines established for Chesapeake Bay are described in **80.510,** chapter 2.

Weather.–This summary provides climatological information applicable to the entire Chesapeake Bay. From November through April Chesapeake Bay, particularly the southern portion, is rough sailing. Storms moving up the Atlantic coast generate winds out of the northeast quadrant ahead of their centers; speeds often reach 30 to 50 knots. Several days of strong and gusty northwest winds may follow. Strong cold fronts from the west can generate 25 to 45 knot gusts over open water. Waves associated with strong winds can be rough and bad chop develops when these winds oppose strong tidal currents. Northerlies of 25 knots or more, over a long fetch of the bay, can easily build 8 to 10 foot seas in the central portion and 5 to 7 foot seas in the south. Seas of 8 feet or more occur about 2 to 4 percent of the time from fall through early spring, in the bay. Gales can occur from September through March.

Another problem during this period is poor visibilities. Fog forms most often when warm, moist air moves across the bay's cold waters from the southeast through south. Most of the 30 to 40 dense fog days each year develop from January through April. Dense fog is more common offshore and should be expected on unusually warm, humid winter and spring days. Fog over particularly cold waters with winds less than 10 knots may drop visibilities to near zero. Preciptiation, particularly snow, may also hamper visibilities.

When temperatures drop below about 28°F and winds are blowing at 13 knots or more, there exists a potential for moderate superstructure icing. This potential exists in the bay from November through March; January and February are the worst months when the potential exists about 3 percent of the time.

During March and April, cold fronts often trigger fast-moving narrow bands of thunderstorms. Preceding the cold front these bands move eastward at 10 to 30 knots generating lightning and gusty winds of gale force. Thunderstorms are also a bay-wide threat during spring and summer when they develop about 6 to 9 days each month. They may develop over land during the afternoon as warm, humid air is forced aloft by surface heating. The thunderstorm may precede a cold front. When a cold front passes during a period of maximum afternoon heating thunderstorms may be severe. In spring and early summer they usually develop to the west of the bay and move toward the northeast at speeds of 25 to 35 knots. Occasionally thunderstorms will approach from the northwest; these are often severe, tend to move very fast, and can pack winds reaching 70 to 90 knots. This type of storm struck Norfolk in June 1977 capsizing a charter fishing boat and tearing away the end of a fishing pier. Severe squall lines can also generate tornadoes which may move over the bay developing waterspouts; winds can exceed 200 knots in these systems. By midsummer, fronts become weaker and less frequent and thunderstorms are mainly the air mass type which move at 10 to 20 knots and usually do not organize into a squall line. Thunderstorms are likely to occur on 8 to 9 days in July compared to 6 to 7 days in August.

Good weather in late summer and fall is compromised mainly by the threat of a tropical cyclone, particularly from mid-August through the first week in October. A hurricane affects the Chesapeake Bay about once every 10 years on the average. Thunderstorms occur on 1 to 3 days per month in September and October and are usually associated with increasingly frequent and rigorous cold fronts. Fog becomes more of a problem, particularly north of Annapolis. This is a morning fog that forms on 1 to 4 days per month during September and October over the upper reaches of the bay; it usually lifts by noon. In late summer and autumn waterspouts may be sighted. These are short-lived and less severe than those associated with thunderstorms; maximum winds climb to about 50 knots. They are caused by cooler air overriding a body of warm moist air in association with a cloud build up over the bay; they usually occur in fair weather.

(See page T-11 for **Chesapeake Bay climatological table.**)

Charts 12221, 12220, 12260.–Chesapeake Bay, the largest inland body of water along the Atlantic coast of the United States, is 168 miles long with a greatest width of 23 miles. The bay is the approach to Norfolk, Newport News, Baltimore, and many lesser ports. Deep-draft vessels use the Atlantic entrance, which is about 10 miles wide between Fishermans Island on the north and Cape Henry on the south. Medium-draft vessels can enter from Delaware Bay on the north via Chesapeake and Delaware Canal, and light-draft vessels can enter from Albemarle Sound on the south via the Intracoastal Waterway.

Mileages.–Many of the distances in this and later Chesapeake Bay chapters are given in nautical miles above the **Virginia Capes,** or "the **Capes,**" which is a short way of referring to a line from Cape Charles Light to Cape Henry Light.

Chesapeake Light (36°54.3'N., 75°42.8'W.), 117 feet above the water, is shown from a blue tower on a white superstructure on four piles, 14 miles eastward of Cape Henry. The name CHESAPEAKE is displayed on all sides. A fog signal and radiobeacon are operated at the station. **Storm warning signals are displayed.** (See chart.) A racon is at the light. A fish haven, consisting of sunken fishing-boat hulls and marked by private unlighted buoys, is about 0.4 mile southwestward of the light.

Cape Charles, on the north side of the entrance, is low and bare, but the land back of it is high and wooded. **Wise Point** is the most southerly mainland tip of the cape. Low **Fishermans Island,** a National Wildlife Refuge, is 1 mile south of Wise Point.

The southwest end of **Smith Island** is 2.4 miles eastward of Wise Point; the island is 6 miles long, low and sparsely wooded, and awash at half tide midway along its length.

Cape Charles Light (37°07.4'N., 75°54.4'W.), 180 feet above the water, is shown from an octagonal, pyramidal skeleton tower, upper part black and lower part white, on the southwestern part of Smith Island. The ruins of the old lighthouse are in shallow water 0.7 mile eastward of the light.

Smith Island Shoal, which breaks in heavy weather, has depths of 21 feet 7.5 miles east-southeast of Cape Charles

Light. Depths less than 40 feet extend another 5 miles northeastward. Outer limits of the shoal area are marked by a lighted buoy.

Nautilus Shoal, which extends 4 miles southeastward from Fishermans Island, has patches with depths of 6 to 11 feet. The buoyed channel along the southwest side of Nautilus Shoal, thence northward between Fishermans Island and **Inner Middle Ground,** had a controlling depth of about 16 feet in 1977-1980. The channel is used by local vessels drawing up to 12 feet. This channel is not recommended for strangers because of shifting shoals.

Breakers frequently occur along the axis of Inner Middle Ground, starting on the seaward side of the Chesapeake Bay Bridge-Tunnel and continuing the entire length of the shoal. This phenomenon appears to be associated with large swells rolling in from sea from the south-southeast to southeast.

Charts 12222, 12221, 12225.–Cape Henry, on the south side of the entrance, has a range of sand hills about 80 feet high.

Cape Henry Light (36°55.6′N., 76°00.4′W.), 164 feet above the water, is shown from an octagonal, pyramidal tower, upper and lower half of each face alternately black and white, on the beach near the turn of the cape; the light station has a radiobeacon. This station also is equipped for special radio-direction-finder calibration. (See Light List for operational information.)

The gray octagonal, pyramidal tower 110 yards southwest of Cape Henry Light is the abandoned 1791 lighthouse.

Local magnetic disturbance.–Differences of as much as 6° from the normal variation have been observed 3 to 17 miles offshore from Cape Henry to Currituck Beach Light.

A **naval restricted area** extends northward and eastward from Cape Henry. (See **334.320,** chapter 2, for limits and regulations.)

The summer resort of **Virginia Beach** is about 5 miles southward of Cape Henry Light. Many high-rise buildings, two water tanks, and an aerobeacon 2.8 miles inland are prominent. A hotel cupola, 3.4 miles south of Cape Henry Light, is distinctive.

The **Chesapeake Bay Bridge-Tunnel** extends from Cape Charles across the bay entrance to a point 6 miles westward of Cape Henry. The 15-mile crossing has vehicular tunnels under Chesapeake Channel and Thimble Shoal Channel with fixed bridges over Fishermans Inlet and secondary channels. In addition to the channel buoys and lights, daybeacons and fog signals mark the openings at Chesapeake and Thimble Shoal Channels. At night the flood-lighted tunnel houses are more prominent than the privately maintained lights marking the channels.

Caution.–The Chesapeake Bay Bridge-Tunnel complex has on several occasions suffered damage from vessels. In every case, adverse weather prevailed with accompanying strong winds from the northwest quadrant generally related to a frontal system. Weather deterioration in the lower bay is quite often sudden and violent and constitutes an extreme hazard to vessels operating or anchoring in this area. The proximity of the bridge-tunnel complex to main shipping channels and anchorages adds to the danger. Currents in excess of 3.0 knots can be expected in the area.

Normal precautions dictated by prudent seamanship are expected of all vessels. Mariners transiting this area are, however, urged to be particularly alert in regards to the weather. To assist in this respect, the National Weather Service provides 24-hour weather broadcasting on 162.55 MHz. The local Marine Operator also transmits weather information at 0000, 0600, 1200, and 1800 local time on 2450 kHz and 2538 kHz. Information of a pending weather frontal passage should be met with advance preparations. Engines readied for short notice maneuvering and anchor details alerted are considered minimum prudent precautions. Maneuvering in close proximity of the bridge-tunnel complex is also discouraged.

A **Regulated Navigation Area** has been established in the waters of the Atlantic Ocean and in Chesapeake Bay. (See **165.1 through 165.13, and 165.501,** chapter 2, for limits and regulations.)

Traffic Separation Schemes (Chesapeake Bay Entrance and Smith Point) have been established for the control of maritime traffic at the entrance of Chesapeake Bay and off Smith Point Light (37°52.8′N., 76°11.0′W.). They have been designed to aid in the prevention of collisions, but are not intended in any way to supersede or alter the applicable Navigation Rules. (See Traffic Separation Schemes, chapter 1, for additional information.)

Traffic Separation Scheme (Chesapeake Bay Entrance).–The scheme provides for inbound-outbound traffic lanes marked by fairway buoys to enter or depart Chesapeake Bay from the northeastward and from the southeastward. **All traffic will leave these fairways buoys on their port hand entering or leaving Chesapeake Bay.**

A precautionary area with a radius of 2 miles is centered on Chesapeake Bay Entrance Junction Lighted Gong Buoy CBJ (36°56.1′N., 75°57.5′W.).

The northeasterly inbound-outbound traffic lanes are separated by a line of four fairway buoys on bearing 250°–070°. The outermost buoy in the line is 6.4 miles 313° from Chesapeake Light and the innermost buoy is 4.5 miles 074° from Cape Henry Light.

The southeasterly inbound-outbound traffic lanes are separated by a line of four fairway buoys on bearing 312°–132°. The outermost buoy is 7.1 miles 246° from Chesapeake Light, and the innermost buoy is 4 miles 101° from Cape Henry Light. (See chart 12221.)

The Coast Guard advises that upon entering the traffic lanes, all inbound vessels are encouraged to make a security broadcast on VHF-FM channel 13, announcing the vessel's name, location, and intentions.

Exercise extreme caution where the two routes converge off Cape Henry. Mariners are also warned that vessels may be maneuvering in the pilotage area which extends into the western part of the precautionary area.

Traffic Separation Scheme (Smith Point).–The turn in the main channel in Chesapeake Bay off Smith Point is marked by a fairway buoy 1.5 miles 090° from Smith Point Light. Northbound traffic will pass eastward of the buoy, and southbound traffic will pass westward of the buoy.

Channels.–The deepest route to and from Chesapeake Bay is south of Chesapeake Light through the buoyed southeasterly traffic lanes. The inbound traffic lane has a controlling depth of about 50 feet, and the outbound lane has a controlling depth of 47 feet, except for a 43-foot spot near the entrance buoy "CB". The route north of Chesapeake Light through the buoyed northeasterly traffic lanes has a controlling depth of about 35 feet for the inbound lane and about 34 feet in the outbound lane. Federal project main channel depths are 42 feet from the Virginia Capes to Baltimore and 45 feet from the Capes to Hampton Roads. (See Notice to Mariners and latest editions of charts for controlling depths.)

The well-marked channel to Baltimore is discussed further in chapters 11 to 15.

Tides.–The mean range of tide is 2.8 feet at Cape Henry.

Currents.–The current velocity is 1.0 knot on the flood and 1.5 knots on the ebb in Chesapeake Bay Entrance. (See the Tidal Current Tables for daily predictions.)

Pilotage is compulsory for all foreign vessels and for U.S. vessels under register in the foreign trade. Pilotage is optional for U.S. vessels under enrollment in the coastwise trade if they have on board a pilot licensed by the Federal Government to operate in these waters.

The Association of Maryland Pilots has an office in Baltimore (301–342–6013, 301–276–1337; cable address MARPILOT) and provides service to any port in Maryland. The Virginia Pilots Association has an office in Norfolk (804–496–0995; cable address VAPILOT) and provides service to any port in Virginia. Vessels bound for Washington, D.C. may take a pilot from either association.

A pilot boat from the Association of Maryland Pilots is stationed in the pilot cruising area off Cape Henry. The pilot boat, a 180-foot converted tugboat, has a black hull, white superstructure, and a blue stack with the number "1" in the center. The pilot boat monitors VHF-FM channels 16, 11, and 13. The pilot boat displays the standard day and night signals. The pilots are carried to and from the ships in 35- and 47-foot-long launches with blue hulls, white houses, and the word "PILOT" across the wheelhouses. The pilots carry portable radiotelephones for bridge-to-bridge communications on channel 13. Vessels proceeding from the Virginia Capes to Washington, D.C. or the upper part of Chesapeake Bay and northward, when using Maryland pilots, sometimes transfer pilots at a designated transfer area off Piney Point on the Potomac River or in Chesapeake Bay off the entrance to Patuxent River, depending on the port of call.

The Virginia Pilots Association maintains a pilot station at Cape Henry, just north of Cape Henry Light. The pilots monitor VHF-FM channels 11, 16, and 74. Other channels are used on request. Four pilot boats are stationed in Lynnhaven Inlet; two are in use at any given time. The pilot boats are 50 feet long with orange hulls and gray houses with the word "PILOT" on each side.

The Chesapeake and Interstate Pilots Association offers pilot services to vessels engaged in the coastwise trade and public vessels between Cape Henry and any port or place on the Chesapeake Bay and its tributaries. Arrangements for pilots are made through ships' agents or the pilot office in Norfolk (telephone, 804-855-2733; cable, CINPILOT). Pilots meet vessels day or night aboard the pilot boat "CHESAPEAKE" which is black with a white house and the word "PILOT" on the sides. At night, the standard pilot lights are displayed. A 12-hour estimated time of arrival (ETA) is requested with any change greater than 1 hour being advised to the pilots. The pilot boat "CHESAPEAKE" monitors VHF-FM channels 16 and 13 1 hour and 30 minutes prior to the vessel's ETA and switches to VHF-FM channel 7A for working traffic.

The Interport Pilots Agency, Inc. offers pilotage to public and U.S. vessels in the coastwise trade transiting to Baltimore, the Chesapeake and Delaware Canal, Philadelphia, New York, Long Island Sound, Cape Cod Canal, and ports in the northeast. Arrangements for any of the above services are made in advance through ships' agents or with their office in Atlantic Highlands, N.J. (telephone 201-291-1310; cable, PORTPILOTS). An updated 12-hour estimated time of arrival (ETA) is requested.

The pilot boat CHESAPEAKE is also used by Interport Pilots Agency,

It has been noted that sometimes considerable differences occur between a vessel's ETA and her actual arrival due to conditions encountered between Cape Hatteras and Cape Henry. Revisions to the ETA of 1 hour or greater should be passed to the pilots especially if the vessel's arrival will be sooner than previously advised.

Charts 12254, 12222, 12256.–Thimble Shoal Channel, the improved approach to Hampton Roads, begins 2.3 miles northwest of Cape Henry Light and extends 9.5 miles west-northwestward; a Federal project provides for a 45-foot-deep channel with a 32-foot-deep auxiliary channel on each side of the main channel. (See Notice to Mariners and latest editions of the charts for controlling depths.)

Naval and **general anchorages** are south of Thimble Shoal Channel. (See **110.1 and 110.168 (g) and (h)**, chapter 2, for limits and regulations.)

Lynnhaven Roads, an open bight westward of Cape Henry, is protected from southerly winds and is sometimes used as an anchorage. The former dumping-ground area in the western part of the bight has shoals and obstructions with depths as little as 11 feet; elsewhere, general depths are 20 to 28 feet. Eastward of Lynnhaven Inlet, the 18-foot curve is no more than 0.3 mile from shore; westward of the inlet, the shoaling is gradual and depths of 18 feet can be found 0.8 mile from shore.

There are two small-craft openings in the Chesapeake Bay Bridge-Tunnel south of Thimble Shoal Channel. Each fixed span has a clearance of 21 feet.

Lynnhaven Inlet, 4 miles westward of Cape Henry Light, is subject to continual change. The inlet is marked by a lighted and an unlighted buoy, daybeacons, and lights. The twin fixed highway bridges over the inlet have a clearance of 35 feet. Overhead power cables close southward of the bridges have clearances of 68 feet. **Lynnhaven Bay,** south of the inlet, has depths of 1 to 10 feet.

A dredged channel marked by a light and daybeacons leads eastward from the south end of the inlet to **Broad Bay.** In June 1986, the midchannel controlling depths were 5½ feet in the channel leading eastward from the south end of the inlet to Daybeacon 6, then 6½ feet to Light 14 at the west end of Broad Bay. Another dredged channel leads eastward from just south of the bridges around the north side of a small island and connects with the southerly channel southeast of the island near Daybeacon 6. In June 1986, the midchannel controlling depth was 6½ feet in the northerly channel. The Great Neck Road fixed highway bridge over the channel 1.2 miles from the twin bridges over the inlet has a clearance of 35 feet; nearby overhead power and telephone cables have a clearance of 55 feet. In 1987, twin fixed highway bridges with a design clearance of 36 feet were under construction about 0.5 mile east of the Great Neck Road bridge.

Caution.–It is reported that this channel has very heavy boat traffic and is especially congested on summer weekends.

An alternate route to Broad Bay is through **Long Creek** which branches northeastward from the dredged channel in the vicinity of Daybeacon 11. In 1984, the controlling depth was 8 feet in Long Creek. In March 1980, shoaling to 3 feet was reported in Long Creek between Daybeacon 5 and Daybeacon 6. The 40-foot span of the Great Neck Road Bridge over Long Creek has a clearance of 20 feet. Nearby overhead cables have a clearance of 37 feet. In 1987, twin fixed highway bridges with a design clearance of 36 feet were under construction about 0.5 mile east of the Great Neck Road bridge.

Depths are about 7 feet in Broad Bay. A marked channel with a controlling depth of 6 feet in July-August 1983, leads southeastward through **The Narrows** to the southern end of **Linkhorn Bay** near Virginia Beach.

Small-craft facilities are inside Lynnhaven Inlet and in both forks of Linkhorn Bay.

Little Creek is entered between jetties 8 miles westward of Cape Henry Light. Most of the creek comprises the **U. S.**

Naval Amphibious Base, but the Virginia and Maryland Railroad operates car floats from the south end terminal to the town of Cape Charles on the Delmarva Peninsula; small craft use the west arm.

A dredged channel in Little Creek leads to a basin off the railroad terminal, 1.2 miles south of the jetties. In June 1987, the reported controlling depth was 20 feet in the channel and in the basin. The channel is marked by a **177°30′** lighted entrance range and by lights. **Little Creek Coast Guard Station** is eastward of the railroad terminal.

Fishermans Cove, on the west side of Little Creek, has fuel and berthing facilities for small craft. A **speed limit** of 5 knots is prescribed for Fishermans Cove. (See **162.60,** chapter 2.)

Naval **danger zones** and **restricted areas** extend northward from the vicinity of Little Creek to the edge of Thimble Shoal Channel. (See **334.310** and **334.370,** chapter 2, for limits and regulations.)

Chart 12245.–Hampton Roads, at the southwest corner of Chesapeake Bay, is entered 16 miles westward of the Virginia Capes. It includes the Port of Norfolk, encompassing the cities of Norfolk, Portsmouth, and Chesapeake, and the Port of Newport News, which takes in the cities of Newport News and Hampton.

Hampton Roads is the world's foremost bulk cargo harbor. Coal, petroleum products, grain, sand and gravel, tobacco, and fertilizer constitute more than 90 percent of the heavy traffic movement by water, although an increasing amount of general cargo is handled by the Hampton Roads ports.

Channels.–The approach to Hampton Roads is through the 45-foot Thimble Shoal Channel. There are natural depths of 80 to 20 feet in the main part of Hampton Roads, but the harbor shoals to less than 10 feet toward the shores. Dredged channels lead to the principal ports.

Two main Federal project channels, marked by buoys, lead through Hampton Roads. One channel leads southward along the waterfronts of Norfolk, Portsmouth, and Chesapeake to the first bridge across the Southern Branch of Elizabeth River; project depths are 45 feet to Lamberts Point thence 40 feet to the bridge. The other channel with a 45-foot project depth leads westward to the waterfront at Newport News at the entrance to James River. (See Notice to Mariners and latest editions of the charts for controlling depths.)

Anchorages.–Numerous general, explosives, naval, and small-craft anchorages are in Hampton Roads and Elizabeth River. (See **110.1 and 110.168,** chapter 2, for limits and regulations.) The areas are shown on charts 12245 and 12253.

Tides.–The mean range of tide is 2.5 feet in Hampton Roads. (See Tide Tables for daily predictions of tides at Sewells Point.)

Currents.–Information for several places in Hampton Roads and Elizabeth River is given in the Tidal Current Tables. The currents are influenced considerably by the winds and at times attain velocities in excess of the tabulated values. The current velocity is about 1.0 knot in Hampton Roads and about 0.6 knot in Elizabeth River.

Ice.–Hampton Roads is free of ice. In severe winters the upper part of Southern Branch, Elizabeth River, is sometimes closed for short periods.

Weather.–The National Weather Service maintains an office at Norfolk International Airport; **barometers** in the Hampton Roads area can be compared there or checked by telephone.

Pilotage for Hampton Roads ports. (See Pilotage at the beginning of this chapter and chapter 3.)

Towage.–Vessels usually proceed from Cape Henry to points in the Hampton Roads port area under their own power and without assistance. A large fleet of tugs is available at Norfolk and Newport News to assist in docking or undocking and in shifting within the harbor.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) The **quarantine anchorage** is southwestward of Old Point Comfort. The U.S. Naval Hospital is in Portsmouth.

Hampton Roads is a **customs port of entry.**

Coast Guard.–A **Marine Safety Office** is in Norfolk. (See appendix for address.)

Harbor regulations.–Port regulations are principally concerned with grain, coal handling, port charges, and pilotage and stevedoring rates. Copies of these regulations may be obtained from the Hampton Roads Maritime Association, 236 East Plume Street, P.O. Box 3528, Norfolk, Va. 23514.

Anchorage regulations are given in **110.1 and 110.168,** chapter 2.

Wharves.–The Hampton Roads area has more than 200 piers and wharves along more than 30 miles of improved waterfront; only the major deepwater facilities are described. Included are coal piers; containerized-cargo berths; oil storage and bunkering facilities; general-cargo, grain, and ore piers; and marine railways and drydocks. Available depths are 22 to 42 feet at the general-cargo, ore, and grain piers; 36 to 45 feet at the coal piers; and 20 to 42 feet. at the oil-storage and bunkering facilities. A 350-ton floating crane is available.

Supplies.–The principal coal-handling and bunkering piers are those of the Norfolk and Western Railway at Lamberts Point, Norfolk, and of the Chesapeake and Ohio Railway at Newport News. Bunker oil is available at Sewells Point, in Southern Branch of Elizabeth River, and at Newport News, or it can be delivered from barges in the stream. Freshwater is available on the principal piers and can be supplied from barges. The area also has numerous ship chandlers and marine suppliers.

Repairs.–Hampton Roads has extensive facilities for drydocking and making major repairs to large deep-draft vessels. The largest floating drydock at Norfolk has a capacity of 54,000 tons, and the largest marine railway can handle 6,000 tons. The shipyard at Newport News is one of the largest and best equipped in the United States; the principal graving dock has a length of 1,600 feet on the keel blocks. There are many other yards that are especially equipped to handle medium-sized and small vessels. More details on these repair facilities are given with the discussion of the waterway or port in which they are located.

Small-craft facilities.–Complete services and repairs are available at Hampton Roads ports. There are marine railways up to 11 tons and mobile hoists up to 60 tons for repairs. (See small-craft facilities tabulations on charts 12205 and 12206 for services and supplies available.)

Communications.–Hampton Roads ports are served by a terminal beltline, several large railroads, and by more than 50 motor carriers. In addition, over 90 steamship lines connect Hampton Roads with the principal U.S. and foreign ports; most of the lines have regular sailings, and others maintain frequent but irregular service. Three airlines offer prompt airfreight, express, and passenger service from

Norfolk and Newport News to major U.S. cities with connecting service overseas.

Thimble Shoal Light (37°00.9′N., 76°14.4′W.), 55 feet above the water, is shown from a red conical tower on a brown cylindrical pier on the eastern edge of the shoal; a fog signal is sounded from the station. The light is 12.3 miles from the Virginia Capes. Thimble Shoal is the southern edge of **Horseshoe,** described in chapter 11.

The entrance to Hampton Roads is between Willoughby Spit and Old Point Comfort, 2 miles to the northward.

A **bridge-tunnel complex** crosses Chesapeake Bay from Willoughby Spit to Hampton.

Old Point Comfort is the site of historic **Fort Monroe.** The Chamberlin Hotel is an excellent landmark. **Old Point Comfort Light** (37°00.1′N., 76°18.4′W.), 54 feet above the water, is shown from a white tower. Only Government craft can tie up at the wharf on the south waterfront of Old Point Comfort.

A naval **restricted area** extends eastward and southward of Old Point Comfort, and a **danger zone** of an army firing range extends to seaward from a point 1.5 miles northward of the point. (See **334.350,** and **334.360,** chapter 2, respectively, for limits and regulations.)

Hampton Bar begins about 200 yards southwestward of Old Point Comfort and extends 2 miles southwestward; depths on the bar are 1 to 5 feet. The bar is marked by two lights and by buoys along its southern edge. These lights, together with one on Hampton Flats, aid vessels in mooring in the naval and other anchorages northward of the main channel.

A dredged channel, marked by a light and daybeacons, leads along the west side of Old Point Comfort to the fish wharves at **Phoebus.** In September 1980, the channel had a controlling depth of 11 feet. The wharves have depths of 8 to 12 feet at their outer ends, but are in poor condition. Small craft can anchor in depths of 8 to 20 feet along the sides of the channel. The Fort Monroe yacht piers are on the east side of the channel 0.4 mile above Old Point Comfort.

Hampton River, 1.5 miles westward of Old Point Comfort, is entered by a marked channel through Hampton Bar and Flats. In December 1980, the controlling depth was 9½ feet (11 feet at midchannel) across Hampton Bar and Flats and in the Hampton River channel to the highway bridge at Hampton. Some small craft also enter west of Hampton Bar. **Hampton,** on the west side of the river 2 miles above the channel entrance, is an important seafood center. Traffic on the river consists of seafood and petroleum products, sand and gravel, and building materials. The residential and commercial areas of Hampton are on the west side of Hampton River; **Hampton Institute** and a Veterans Hospital are on the east side.

Sunset Creek, on the west side just above the Hampton River mouth, is entered by a marked dredged channel leading westward from the channel in the river. In December 1980, the controlling depth was 12 feet to the head of the creek.

The principal commercial wharves at Hampton, just below the bridge, have depths of 7 to 12 feet at their faces. The public landing 500 yards below the bridge has depths of 8 feet at the face; small boats anchor between the public landing and the bridge. The wharves along Sunset Creek have depths of 4 to 9 feet at their outer ends.

Supplies and fuel are available at Hampton. A yacht club and several marinas here have berthing space. Repairs can be made; largest marine railway, 120 feet; lift, 35 tons.

Jones Creek, on the east side of Hampton River 300 yards above the mouth, has depths of 8 to 11 feet. The bulkheads have depths of 3 to 10 feet alongside and are controlled by the Veterans Hospital on the south and Hampton Institute on the north.

Salters Creek, 4 miles west-southwestward of Old Point Comfort, has a narrow unmarked approach channel with depths of 2 feet. The fixed highway bridge over the entrance has a channel width of 24 feet and a clearance of 9 feet. Numerous small craft moor above the bridge in a basin that has depths of about 5 feet.

The 45-foot project channel to Newport News was discussed earlier. Depths along the edges of the dredged section are 19 to 25 feet. The currents do not always set fair with the channel, especially with strong winds, and deep-draft vessels sometimes find it difficult to stay in the channel.

Newport News Middle Ground Light (36°56.7′N., 76°23.5′W.), 52 feet above the water, is shown from a red conical tower on a red cylindrical pier in 15 feet of water near the western end of the shoal; a seasonal fog signal is at the light.

Newport News Point (36°57.8′N., 76°24.7′W.) on the north side of the entrance to James River, is 21.5 miles from the Virginia Capes. The city of **Newport News** extends several miles along the northeast bank of James River.

Newport News Creek, just west of Newport News Point is a city-owned small-boat harbor used by fishing boats, pleasure craft, and petroleum barges. In January 1985, the controlling depth was 12 feet in the dredged channel for about 0.6 mile above the mouth. A light marks the west side of the entrance. Fuel, supplies, and slips are available, and repairs can be made. A 75-ton marine railway and a 40-ton mobile hoist are available.

Newport News Shipbuilding and Drydock Company is just below the James River Bridge on the east side of the river. A security zone is along the waterfront of the company property. (See **165.30, 165.33 and 165.504,** chapter 2, for limits and regulations.)

Wharves.–The deepwater piers and wharves at Newport News extend from Newport News Point for 2.5 miles up James River. Only the major facilities are described. All have access to highways and railroads, freshwater connections, and electric shore-power connections. Unless otherwise indicated, these facilities are owned by the Virginia Ports Authority. The alongside depths given for each facility described are reported depths. (For information on the latest depths, contact the operator.) For a complete description of the port facilities at Newport News, refer to Port Series No. 11, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

Chart 12245:

Newport News Marine Terminal Pier 2 (36°58′24″N., 76°26′00″W.): north and south sides 606 feet long; 32 feet along north side, 35 feet along south side; deck height, 8 feet; receipt and shipment of bulk cargo; operated by Virginia International Terminals.

Newport News Marine Terminal Pier B: about 200 yards southeastward of Newport News Marine Terminal Pier 2; 543-foot face, north and south sides 620 feet long; 35 feet along north side, 40 feet along south side and face; deck height, 15 feet; 268,000 square feet covered storage; 8 acres of open storage; receipt and shipment of general and roll-on/roll-off cargo; operated by Virginia International Terminals.

Newport News Marine Terminal Pier C: about 150 yards southeastward of Newport News Marine Terminal Pier B; 552-foot face, 35 feet alongside; north side, 755 feet long; 35 feet alongside; south side, 935 feet long; 40 feet alongside; 410,000 square feet covered storage; 200-ton-capacity con-

tainer crane, 50-ton gantry crane; use of equipment from Pier B; receipt and shipment of general, containerized and roll-on/roll-off cargo; operated by Virginia International Terminals.

Pier 8 Terminal: about 700 yards southeastward of Newport News Marine Terminal Pier 2; 213-foot face; north and south sides 818 feet long; 32 feet alongside; deck height, 15 feet; 138,000 square feet covered storage; 20-ton crane available, forklift trucks; receipt of general cargo; operated by Tidewater Stevedoring Corp.

Massey Coal Terminal Pier 9 (36°58′05″N., 76°25′44″W.): east and west sides 1,200 feet long; 46 feet alongside; deck height, 11½ feet; tandem in-line rotary car dumper with unloading rate of 5,000 tons per hour; traveling shiploader with loading rate of 8,000 tons per hour; receipt and shipment of coal; owned and operated by Massey Coal Terminal Corp.

C. & O. Pier 14: about 0.75 mile southeastward of Pier 8 Terminal; east and west sides 1,090 feet long; 45 feet alongside; deck height, 11½ feet; two traveling coal-loading towers, 4,500-ton-per-hour capacity each; shipment of coal; owned and operated by the Chessie System.

C. & O. Pier 15: eastward of C. & O. Pier 14; west side 1,000 feet long; 38 feet alongside; deck height, 9½ feet; one fixed coal-loading tower on each side of the pier, ship-positioning winches; shipment of coal; owned and operated by the Chessie System. East side is not used.

Koch Fuels, Inc. Tanker Dock: about 200 yards eastward of C. & O. Pier 15; offshore wharf, 203 feet with platform; 35 feet alongside; deck height, 13 feet; storage tanks, 520,000-barrel capacity; receipt and shipment of petroleum products, bunkering vessels; operated by Koch Fuels, Inc.

The facilities of the Newport News Shipbuilding and Drydock Co. begin 1.7 miles northwest of Newport News Point and extend 2 miles upriver. The company operates five outfitting piers; four drydocks, the largest being 862 feet long, 118 feet wide, and a depth of 31 feet over the sill; and three graving docks used for ship construction and repair, the largest being 1,600 feet long and 250 feet wide with a depth over the sill of 33 feet. Gantry cranes of 900 and 310 tons serve the graving docks. The shipyard also has two inclining shipways with lengths to 650 feet. The largest shaft produced by the shipyard is 76 feet by 60 inches. Most of the outfitting piers are equipped with cranes; largest has a capacity of 50 tons. Floating derricks up to 67-ton capacity are available at the yard.

Willoughby Spit, on the south side of the entrance to Hampton Roads, is a narrow barrier beach 1.3 miles long in an east-west direction. About midway between the spit and Old Point Comfort, on the opposite side of the entrance, is **Fort Wool,** which is on the south edge of the main ship channel; a light is shown from a small gray house on the north side of the island.

The 45-foot-wide small-boat openings in the south approach bridge to Hampton Roads Tunnel have clearances of 10 feet.

Willoughby Bank, with depths of 3 to 7 feet, extends east-northeastward along the edge of the main channel for about 2.5 miles from Fort Wool.

Willoughby Bay, on the inner side of Willoughby Spit, has general depths of 7 to 12 feet. On the south side of the bay are the prominent buildings of the Norfolk Naval Base and the Naval Air Station. A marked channel, 0.4 mile westward of Fort Wool, leads to a small-boat harbor behind the hook of Willoughby Spit. In March 1985, the reported controlling depth was 5 feet. In July 1985, shoaling to 3 feet was reported on the eastern edge of the channel between Daybeacon 1 and Daybeacon 3. Some supplies, fuel, and berthing are available. Repairs can be made; largest marine railway, 40 feet.

The western and southern part of Willoughby Bay is a **restricted area.** (See **334.300,** chapter 2, for limits and regulations.) The northern part of the bay is a **small-craft anchorage.** (See **110.1 and 110.168 (f) and (h)),** chapter 2, for limits and regulations.)

A fixed highway bridge with a clearance of 25 feet crosses the yacht anchorage in the northern part of Willoughby Bay.

Charts 12245, 12253.–Norfolk Harbor comprises a portion of the southern and eastern shores of Hampton Roads and both shores of **Elizabeth River** and its Eastern, Southern, and Western Branches, on which the cities of Norfolk, Portsmouth, and Chesapeake are located.

The harbor extends from off Sewells Point south in Elizabeth River to the seventh bridge over Southern Branch, a distance of 15 miles; it extends 1.5 miles up Western Branch to a point 0.5 mile above the West Norfolk highway bridge, and up Eastern Branch for 2.5 miles to the Norfolk and Western Railway Bridge.

The main part of Norfolk is on the east side of Elizabeth River north of Eastern Branch, with Berkley, a subdivision, to the southward between Eastern and Southern Branches. South of Berkley is the city of Chesapeake. Portsmouth is opposite Norfolk, and its waterfront extends along the west shore of Southern Branch and the south shore of Western Branch. These cities form practically a single community, united by the same commercial interests and served by the same ship channel.

A **safety zone** is in effect in the Elizabeth River when a naval aircraft carrier transits the river to or from the Norfolk Naval Shipyard. (See **165.505,** chapter 2, for limits and regulations.)

Weather.–Norfolk, with an average elevation of 13 feet above sea level and almost surrounded by water, has a modified marine climate. The city's geographic position with respect to the principal storm tracks is especially favorable, being south of the average path of storms originating in the higher latitudes and north of the usual track of hurricanes and other tropical storms. These features combine to place Norfolk in one of the favored climatic regions of the world. The winters are mild, while autumn and spring seasons usually are delightful. Summers, though warm and long, frequently are tempered by cool periods, often associated with northeasterly winds off the Atlantic. Temperatures of 100° or higher are very infrequent. Cold waves seldom penetrate to this area. Occasional winters pass without a measurable amount of snowfall. Most of Norfolk's snow generally occurs in light falls, which usually melt and disappear within 24 hours. The average date of the last freezing temperature in the spring is March 23, while the average date of the first in autumn is November 18. The average annual amount of rainfall is about 45 inches, and considerably more than one-half of it falls in well-distributed amounts during April to October, inclusive. (See page **T–4 Norfolk climatological table.) Storm warning signals are displayed.** (See chart.)

Chart 12245.–Sewells Point (36°57.8′N., 76°19.6′W.), on the east side of the entrance to Elizabeth River, is 18 miles from the Virginia Capes. A breakwater, marked by a light on its outer end, extends about 0.3 mile westward from the point. The piers of the **Norfolk Naval Base** and its annex extend southward from the breakwater along the east bank of the river. Depths at the naval piers are 33 to 45 feet. A jettied basin at the naval base, 0.6 mile south of Sewells

Point, affords protection for navy service craft in depths of 21 to 29 feet.

Sewells Point Spit, covered 3 to 6 feet, extends north-northeastward from the point for 1.4 miles to the outer end of Willoughby Channel.

A channel, marked by lights and daybeacons, extends eastward and southward through Sewells Point Spit for about 1.2 miles to an enclosed boat basin used by small navy boats. In May 1974, the channel had a controlling depth of 10 feet; depths of 7 to 10 feet were available in the basin.

The approach to the naval piers is a **restricted area.** (See **207.155,** chapter 2, for limits and regulations.)

Wharves.–Norfolk Harbor has numerous wharves and piers of all types, the majority of which are privately owned and operated; only the major deepwater facilities are described. These facilities are southward of Sewells Point, between the Norfolk Naval Base and Tanner Point; on Lamberts Point; on Pinner Point; and on Eastern Branch and Southern Branch of Elizabeth River. All have freshwater connections and access to highways and railroads, and most have electrical shore-power connections. Cargo is generally handled by ship's tackle; special cargo-handling equipment, if available, is mentioned in the description of the particular facility. The alongside depths given for each facility described are reported depths. (For information on the latest depths, contact the operator.) For a complete description of the wharves and piers in Norfolk Harbor refer to Port Series No. 11, published and sold by the U.S. Army Corps of Engineers. (See appendix for address.)

Facilities southward of Sewells Point, between Norfolk Naval Base and Tanner Point (chart 12245):

Continental Grain Co. Wharf (36°55′57″N., 76°19′41″W.): face 1,035 feet; 40 feet alongside; deck height 9 feet; face of wharf in line and contiguous with Virginia Ports Authority Pier B to the westward; 3¼-million-bushel grain elevator; railroad car and truck dumpers; loading tower, marine leg, and conveyor system, combined loading rate 80,000 bushels per hour; receipt and shipment of grains; owned by Virginia Port Authority and operated by Continental Grain Co.

Virginia Ports Authority, Piers A and B: immediately westward of Continental Grain Co. Wharf; 498-foot face, 32 feet alongside; Pier B (north side) 1,211 feet long, 32 feet alongside; Pier A (south side) 1,193 feet long, 32 feet alongside; deck height, 9½ feet; 230,000 square feet covered storage; cranes up to 15-ton capacity; receipt and shipment of general cargo and shipment of scrap metal; owned by Virginia Ports Authority and operated by Lamberts Point Docks, Inc. A buoy marks a shoal just northward of Pier B.

Lehigh Portland Cement Pier: 150 yards southward of Virginia Ports Authority Piers; 40-foot face, 205 feet with dolphins; 33 feet alongside; deck height, 11½ feet; 33,000-ton storage capacity; unloading rate 600 tons per hour; receipt of bulk cement; owned and operated by Lehigh Portland Cement Co.

Exxon Co., U.S.A. Pier (36°55′39″N., 76°20′00″W.): about 0.2 mile southward of Virginia Ports Authority Piers; north and south sides 1,300 feet; north side, 40 feet alongside; south side, 20 to 30 feet alongside; deck height, 9 feet; storage tanks, 2½-million-barrel capacity; receipt and shipment of petroleum products, bunkering vessels; owned and operated by Exxon Co., U.S.A.

Norfolk International Terminals: 900,000 square feet covered storage; 300,000 cubic feet cold storage; 55 acres open storage; deck heights, 9½ feet; receipt and shipment of general and containerized cargo; receipt of logs; passengers; owned by Virginia Ports Authority and operated by Virginia International Terminals.

Pier 2 (36°55′02″N., 76°19′56″W.): 334-foot face, north and south sides 1,328 feet long; 35 feet along north side, 42 feet along south side.

North Berth: immediately northward of Pier 2; 950-foot marginal wharf; 32 feet alongside; roll-on/roll-off berth.

Pier 1: about 200 yards southward of Pier 2; 300-foot face, north and south sides 1,328 feet long; 42 feet along north side, 35 feet along south side; fumigation chambers.

Container Berths 1, 2, and 3: immediately southward of Pier 1; 2,688-foot marginal wharf; 35 feet alongside; one 30-ton and three 50-ton rail-mounted cranes, four 40-ton traveling container carriers.

Facilities at Lamberts Point (chart 12253):

Norfolk and Western Railway Co. Piers: owned and operated by Norfolk and Western Railway Co.; shipment of coal.

Pier 6 (36°52′45″N., 76°19′54″W.): 88-foot face; 45 feet alongside; north and south sides 1,600 feet, 1,800 feet with dolphins, 46 feet alongside; deck height, 11 feet; two electric shiploaders, loading rate 5,000 tons per hour each.

Pier 5: about 200 yards southward of Pier 6; 74-foot face; south side 1,000 feet; 36 feet alongside; deck height, 11 feet; one electric dumper with a loading capacity of 1,000 tons per hour; ship-positioning winches on south side.

Virginia Ports Authority Terminal, Piers N, L, and P: 1.5 million square feet covered storage; 100,000 cubic feet cold storage space; fumigation chambers; storage tanks, 10,000-ton capacity; forklift trucks and other portable mechanized cargo-handling equipment; cranes up to 25-ton capacity; receipt and shipment of general and containerized cargo; receipt of castor oil and shipment of soybean, palm and coconut oils; owned by Virginia Ports Authority and operated by Lamberts Point Docks, Inc.

Pier N (36°52′00″N., 76°19′06″W.): 390-foot face, 24 feet alongside; north and south sides 1,100 feet long, 32 feet alongside; deck height, 11½ feet.

Pier L: about 200 yards southeastward of Pier N; 243-foot face; north side 1,180 feet, south side 1,200 feet long; 32 feet alongside; deck height, 9 feet.

Pier P: about 600 yards southeastward of Pier N; 396-foot face; north and south sides 1,196 feet long; 32 feet alongside; deck height, 11 feet.

Facilities at Port Norfolk (chart 12253):

Portsmouth Marine Terminal (36°51′27″N., 76°19′27″W.): 2,380-foot face; 60-foot roll-on/roll-off ramp; 36 feet alongside except 31 feet near the west end; deck height, 12 feet; 300,000 square feet covered storage, 215 acres open storage; cranes to 110 tons, container cranes to 30 tons; fumigation chambers; receipt and shipment of general, containerized and roll-on/roll-off cargo; receipt of automobiles; shipment of tobacco; owned by Virginia Ports Authority and operated by Virginia International Terminals.

Sea-Land Service Terminal (36°51′28″N., 76°19′04″W.): 600-foot face, 1,000 feet with dolphins; 38 feet alongside; deck height, 12 feet; 30,000 square feet covered storage, open storage for 650 containers; two 30-ton container cranes; receipt and shipment of general and containerized cargo; owned and operated by Sea-Land Service, Inc.

Facilities in Eastern Branch of Elizabeth River (chart 12253):

Norfolk, Baltimore, and Carolina Line Terminal: 33,000 square feet covered storage area; receipt and shipment of containerized general cargo in the intracoastal trade; owned and operated by the Norfolk, Baltimore, and Carolina Line, Inc.

Pier No. 2 (36°50′33″N., 76°17′07″W.): 68-foot face; 20 feet alongside; deck height, 8 feet.

Pier No. 1: about 50 yards eastward of Pier 2; 46-foot face, 20 feet alongside; deck height, 8 feet.

Chemphalt Wharf (36°50′19″N., 76°16′19″W.): 50-foot offshore wharf with 300 feet of berthing space with dolphins; 35 feet alongside; deck height, 9 feet; storage tanks, 300,000-barrel capacity; receipt of asphalt, liquid fertilizer, and styrene monomer; owned and operated by Chemphalt of Carolina Corp.

Facilities in Southern Branch of Elizabeth River, Berkley, Chesapeake, and Portsmouth (chart 12253):

U.S. Gypsum Co. Wharf (36°49′18″N., 76°17′23″W.): 40-foot offshore wharf, 370 feet with dolphins; 27 feet alongside; deck height, 10 feet; storage shed, 47,000-ton capacity; open storage for 100,000 tons; receipt of gypsum rock; owned and operated by U. S. Gypsum Co.

Crown Central Petroleum Corp. Wharf (36°49′14″N., 76°17′24″W.): 40-foot T-head pier, 145 feet with dolphins; 30 feet alongside; deck height, 6 feet; 214,000-barrel storage capacity; receipt and shipment of petroleum products; operated by Crown Central Petroleum Corp.

Mobil Oil Corp. Tanker Wharf (36°49′11″N., 76°17′23″W.): 75-foot T-head wharf, 750 feet with dolphins; 36 feet alongside; deck height, 10 feet; receipt and shipment of petroleum products, bunkering vessels; 683,000-barrel storage facility; owned by Mobil Oil Corp., operated by Mobil Oil Corp., and Union Oil Co. of California.

Gulf Oil Co. Wharf: 200 yards south of Mobil Oil Wharf; 1,020-foot face, 30 to 32 feet alongside; deck height, 12 feet; receipt and shipment of petroleum products, bunkering vessels; 800,000-barrel storage facility; owned and operated by Gulf Oil Refining and Marketing Co.

Lone Star Industries, Cement Wharf: 100 yards south of Gulf Oil Co. Wharf; 27-foot platforms with 267 feet of berthing space; 35 feet alongside; deck height, 10 feet; silos, 37,000-ton capacity; receipt of cement clinker; owned and operated by Lone Star Industries, Inc.

Royster Co. Wharf (36°48′46″N., 76°17′24″W.): marginal type wharf, 450 feet with dolphins; 25 feet alongside; deck height, 9 feet; shipment of fertilizer products; owned and operated by Royster Co.

Amoco Oil Co. Wharf (36°48′21″N., 76°17′22″W.): 60-foot T-head pier, 235 feet with dolphins; 27 to 29 feet alongside; deck height, 11 feet; 655,000-barrel storage facility; receipt and shipment of petroleum products; receipt of asphalt; shipment of soybean oil; bunkering vessels; owned and operated by Amoco Oil Co.

Cargill Ship Dock (36°48′06″N., 76°17′20″W.): 800 feet long; 39 feet alongside; deck height, 10 feet; 6¾-million-bushel elevator; elevator loading rate 60,000 bushels per hour; shipment of grain and soybean meal; owned and operated by Cargill Inc.

Texaco Oil Co. Wharf (36°47′51″N., 76°17′29″W.): marginal wharf, 565 feet with dolphins; 32 feet alongside; deck height, 12 feet; 1½-million-barrel storage capacity; receipt and shipment of petroleum products; receipt of asphalt; bunkering vessels; owned and operated by Texaco Inc.

Conoco Wharf (36°47′44″N., 76°17′32″W.): 145-foot T-head wharf, 650 feet with dolphins; 31 feet alongside; deck height, 10 feet; receipt and shipment of petroleum products; 700,000-barrel storage facility; owned and operated by Conoco.

Lone Star Industries Ulexite Plant Pier (36°47′27″N., 76°17′50″W.): north side, 447 feet long; 36 feet alongside; deck height, 12 feet; open storage for 27,000 tons; receipt and shipment of pumice and ulexite, shipment of fertilizer; owned and operated by Lone Star Industries, Inc.

Tenneco-Cities Service Pier (36°47′22″N., 76°18′07″W.): 55-foot face, 208 feet with dolphins; 27 feet alongside; deck height, 8 feet; storage tanks, 350,000-barrel capacity; receipt and shipment of petroleum products; receipt of creosote and coal tar; owned and operated by Tenneco-Cities Service.

Amerada Hess Corp. Tanker Dock (36°47′06″N., 76°18′10″W.): 68-foot offshore wharf with berthing space for vessels to 700 feet; 35 feet alongside; deck height, 13½ feet; tanks, 500,000-barrel storage capacity; receipt and shipment of petroleum products; owned and operated by Amerada Hess Corp.

Atlantic Cement Co. Wharf (36°46′42″N., 76°18′22″W.): 465 feet long with dolphins; 30 to 31 feet alongside; deck height, 10½ feet; 31,000-ton capacity storage silos; receipt of bulk cement; owned and operated by Atlantic Cement Co.

Elizabeth River Terminals, Piers 1 and 2 (36°46′40″N., 76°18′05″W.): Pier 1, 758 feet long with dolphins; deck height, 8½ feet; Pier 2, 512 feet long with dolphins; deck height, 11 feet; both piers 35 feet alongside; 250,000 square feet of open storage; 36,000 tons of tank storage; cranes to 50 tons; receipt and shipment of liquid sulfur; receipt of chemicals, scrap metals, and bulk materials; shipment of fertilizer and animal feed; owned and operated by Elizabeth River Terminals, Inc.

Chilean Nitrate Wharf (36°46.6′N., 76°17.7′W.): 350-foot offshore wharf, 395 feet with dolphins; 32 feet alongside; deck height, 11 feet; covered storage for 28,000 tons of fertilizer; receipt of bulk fertilizers; owned and operated by the Chilean Nitrate Sales Corp.

Smith-Douglass Wharf (36°46′25″N., 76°17′40″W.): 365-foot face, 500 feet long with dolphins; 30 feet alongside; deck height, 12 feet; covered storage for 65,000 tons of fertilizer; receipt of spent sulphuric acid; owned and operated by Smith-Douglass Division of Borden Chemical Co.

Hitch Terminal Tanker Wharf (36°46′21″N., 76°17′51″W.): 30-foot offshore wharf, 200 feet long with dolphins; 30 feet alongside; deck height, 8 feet; tank storage for nitrogen, capacity 146,000 barrels, petroleum tank storage, capacity 323,000 barrels; receipt of liquid nitrogen; owned by Arthur Hitch, Jr.; operated by Hitch Terminal Corp. and Swift Nitrogen Terminal.

American Hoechst Corp. Wharf (36°45′28″N., 76°17′37″W.): offshore wharf, 190 feet long with dolphins; 22 feet alongside; deck height, 10 feet; storage tanks for 120,000 barrels; receipt of styrene monomer; owned and operated by American Hoechst Corp.

Portsmouth Power Station Wharf (36°46′11″N., 76°17′55″W.): 75-foot face, berthing space for vessels to 800 feet; 36 feet alongside; deck height, 10 feet; storage tanks for 475,000 barrels; receipt of fuel oils for plant consumption; owned and operated by Virginia Electric and Power Co.

Swann Oil Co. Wharf (36°46′36″N., 76°18′25″W.): 50-foot T-head pier, 280 feet with dolphins; 35 feet alongside; deck height, 12 feet; 850,000-barrel storage facility; receipt of petroleum products; owned and operated by Swann Oil Co.

Atlantic Energy, Inc. Wharf (36°46′43″N., 76°18′41″W.): 30-foot offshore wharf, 700 feet of berthing with dolphins; 32 feet alongside; storage tanks, 480,000-barrel capacity; receipt of liquified petroleum gases; owned and operated by Atlantic Energy, Inc.

Alcoa Transfer Station Pier (39°47′54″N., 76°17′42″W.): 750 feet long; 42 feet alongside; deck height, 15 feet; 55,000-ton storage tank; unloading tower with unloading rate of 1,100 tons per hour; and conveyor system to storage tank; receipt of alumina; owned and operated by Aluminum Co. of America.

BP Oil Co. Wharf (36°47′57″N., 76°17′45″W.): 330-foot offshore wharf, 360 feet of berthing with dolphins; 30 feet alongside; deck height, 12 feet; storage tanks, 410,000-barrel

capacity; shipment of petroleum products; owned and operated by the BP Oil Co., Inc.

Allied Mills Wharf (36°48′00″N., 76°17′45″W.): 81-foot face, 275 feet of berthing with dolphins; 25 feet alongside; deck height, 12 feet; receipt of bulk molasses; 2-million-gallon molasses storage tank; grain elevator, 375,000-bushel capacity; owned by Allied Mills Inc.; operated by Southgate Molasses Co. Inc.

A disposal area, enclosed by levees, is in Hampton Roads on the north side of Craney Island. A smaller levee extends eastward from the lower east side of the disposal area to a dolphin 0.2 mile west of the ship channel; the section of the levee east of about 36°54.0′N., 76°20.8′W. covers at high water.

Lafayette River empties into the east side of Elizabeth River 4 miles south of Sewells Point and 22 miles from the Virginia Capes. The river, used exclusively by pleasure and recreational craft, is entered by a marked dredged channel between **Tanner Point** and Lamberts Point, 1.5 miles to the southward. A light, 0.6 mile south of Tanner Point, marks the channel entrance. The dredged channel leads for 1.1 miles to a point about 0.3 mile westward of the Hampton Boulevard Bridge. From this point, a marked natural channel leads for about 2.4 miles to where the river divides into two forks. In August 1984, the controlling depth was 8 feet in the dredged section; thence depths of about 6 feet to the forks, and 2 to 4 feet up each fork; the chart is the best guide. The dredged channel turns sharply at the light off **Lawless Point,** a mile above the entrance, and vessels must be on the alert to avoid grounding. **General and small-craft anchorages** extend up Lafayette River to the first bridge. (See **110.168 (c) and (h),** chapter 2, for limits and regulations.)

Hampton Boulevard Bridge, 1.5 miles above the entrance to Lafayette River, has a fixed channel span with a clearance of 26 feet. A yacht club is just below the north end of the bridge.

Knitting Mill Creek, is on the south side of Lafayette River about 3 miles above the mouth. In May 1985, the creek had a midchannel controlling depth of 4 feet to the head. Some supplies, gasoline, and berths are available within the creek. Repairs can be made; largest marine railway, 40 feet; lift, 10 tons.

East Haven, on the south side of Lafayette River about 3.5 miles above the mouth, has a dredged channel that leads to a settling basin and boat ramp at the head. In January 1981, a controlling depth of 6 feet was in the channel and 8 feet in the basin.

Granby Street Bridge, 3.5 miles above the entrance to Lafayette River, has a 40-foot fixed span with a clearance of 22 feet.

Just above Granby Street Bridge (chart 12253), Lafayette River divides into two forks, both unmarked. A fixed highway bridge over the mouth of the north fork has a channel width of 30 feet and a clearance of 10 feet. In 1986, a replacement fixed bridge with a design clearance of 18 feet was under construction adjacent to the existing bridge. A fixed highway bridge over the south fork, a mile from Granby Street Bridge, has a channel width of 27 feet and a clearance of 9 feet; another fixed highway bridge 0.3 mile farther up the south fork has a channel width of 23 feet and a clearance of 4 feet.

Chart 12253.–Craney Island, now a part of the mainland, is on the west side of Elizabeth River 4.5 miles south of Sewells Point. The low and thinly wooded area is the site of a navy fuel depot, and the offshore wharf and piers, all on the eastern side, are used only by Government vessels. Two daybeacons close off the northeast end of Craney Island mark submerged rocks. The offshore wharf and piers have depths of 22 to 47 feet alongside. A submerged water main crosses from Craney Island to the north side of Lamberts Point; vessels are cautioned not to anchor in the vicinity of the lighted range that marks the crossing. **Portsmouth Coast Guard Station** is on the west side of the entrance to Craney Island Creek.

Lamberts Point, on the east side of Elizabeth River 5.3 miles south of Sewells Point, is the site of several deepwater piers. These facilities were described earlier in this chapter under Wharves, Norfolk Harbor.

Western Branch (36°52.0′N., 76°19.7′W.) empties into the southwest side of Elizabeth River 5.8 miles south of Sewells Point and 23.8 miles from the capes. A marked channel leads from the main channel in Elizabeth River for 4.5 miles upstream. In June-July 1987, the midchannel controlling depth was 18 feet in the dredged channel to about 0.25 mile above the first bridge; then in 1980, about 7 feet could be carried to **Drum Point** , 0.5 mile above the third bridge.

A 540-foot lighted pier about 1 mile above the entrance to Western Branch extends to the northern edge of the marked channel; mariners are advised to use caution in the area. A fixed highway bridge, about 1.2 miles above the entrance, has a clearance of 45 feet.

West Norfolk, northward of the fixed bridge, has a shipyard and small-craft facilities. Supplies, fuel, and slips are available. Repairs can be made; largest marine railway, 220 feet.

Churchland twin fixed highway bridges, 2.3 miles above the entrance to Western Branch, have clearances of 38 feet. The overhead power cable on the upper side of the bridge has a clearance of 45 feet; the transmission towers are marked by lights.

A 280-foot fishing pier extends from the southeast shore about 1.4 miles above the Churchland bridges. An overhead power cable close upstream of the pier has a clearance of 47 feet. **Hodges Ferry** fixed highway bridge, 4.7 miles above the entrance, has a clearance of 18 feet. The overhead power cable on the upstream side of the Hodges Ferry bridge has a clearance of 37 feet.

Pinner Point (36°51.3′N., 76°19.1′W.) is on the southwest side of Elizabeth River, 6.8 miles from Sewells Point. Most of the piers at the point have been destroyed by fire or are in poor condition; they are being razed or renovated. The Portsmouth Marine Terminals, Inc. operates the facilities at the Portsmouth Marine Terminal about 0.3 mile northwestward of Pinner Point. A marked dredged channel leads from Elizabeth River to a docking area at the terminal. In July 1979, the controlling depth to and in the docking area was 35 feet. The facilities of the Portsmouth Marine Terminal and those at Pinner Point were described earlier in this chapter under Wharves, Norfolk Harbor.

Scott Creek (36°51.1′N., 76°18.5′W.), on the southwest side of Elizabeth River 7.3 miles from Sewells Point, is entered through a channel, marked by daybeacons, which had a controlling depth of 4½ feet in March 1971. The channel leads to old fishing wharves now used by pleasure craft. A marina with a 60-ton lift is on the S side of the creek about 0.4 mile above channel entrance. A marina is on the point on the south side of the creek, about 0.9 mile above the channel entrance. Berths, water, a 60-foot marine railway, and a 3½-ton fixed lift are available; hull repairs can be made.

Hospital Point, on the southwest side of Elizabeth River 7.5 miles from Sewells Point, is the site of a U.S. Naval Hospital. The main hospital building, the largest structure

along the southwest side of Elizabeth River, is visible for many miles. The hospital landing has depths of about 18 feet at the face.

Norfolk, or parts of it, has been described at some length in the preceding text. The midpoint of the downtown section can be taken as the **City Wharf** (36°50.9′N., 76°17.8′ W.) at the foot of West Main Street, which is on the northwest side of Elizabeth River 7.7 miles from Sewells Point and 25.7 miles from the Virginia Capes. City Wharf has depths of 15 feet at the face, but is in poor condition. The wharves northwest and southwest of West Main Street have depths of 14 to 20 feet alongside.

(See page T–7 for **Norfolk climatological table.**) A **weather** summary for Norfolk is given in the preceding text under Norfolk Harbor.

Smith Creek, opposite Hospital Point 7.5 miles from Sewells Point, has entrance depths of about 3 feet with deeper water inside, but the entrance is restricted by a 48-foot-wide fixed highway bridge with a clearance of 13 feet. **Small-craft anchorages** are in Smith Creek. (See **110.1 and 110.168 (d)(4) and (h),** chapter 2, for limits and regulations.)

The **Atlantic Marine Center,** the Atlantic shipbase of the National Ocean Service, is on the east side of the entrance to Smith Creek. There are 243-, 251-, and 312-foot berths along the bulkhead wharf, which has depths of 20 feet alongside.

Waterside is in the downtown area of Norfolk, the north side of the intersection between Elizabeth River and Eastern Branch. A municipal marina at this popular tourist stop has reported depths of about 16 feet at the entrance, inside the marina, and alongside the berths. Transient berths are available year-round. A sewage pump-out station is at the marina. Electricity is at the berths; ice and provisions are available nearby. The marina staff monitors VHF-FM channels 16 and 68.

Eastern Branch (36°50.5′N., 76°17.6′W.) empties into the east side of Elizabeth River 8 miles from Sewells Point and 26 miles from the Virginia Capes.

A Federal project provides for a channel 25 feet deep to the Norfolk and Western Railway Bridge, 2.5 miles above the entrance. (See Notice to Mariners and latest edition of the charts for controlling depths.)

Above the Norfolk and Western Railway Bridge, the natural channel has depths of 10 to 18 feet to the forks 3.3 miles from the entrance, and usually is marked by bush stakes.

General anchorages are in Eastern Branch. (See **110.168 (e) and (h),** chapter 2, for limits and regulations.)

Downtown Norfolk is on the north side of Eastern Branch, and **Berkley,** a subdivision, is on the south side. Traffic is fairly heavy as far as Campostella Bridge. Depths at most of the piers on both sides of the branch range from 14 to 25 feet.

The highway bridge, 0.4 mile above the entrance to Eastern Branch, has a bascule span with a clearance of 48 feet. The Norfolk and Western Railway Bridge, 1 mile above the entrance, has a bascule span with a clearance of 4 feet. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) An overhead power cable 200 yards east of this bridge has a clearance of 150 feet.

Campostella Bridge, 1.4 miles above the entrance to Eastern Branch, has a bascule span with a clearance of 14 feet. In October 1984, a replacement fixed span with a design clearance of 65 feet was under construction adjacent to Campostella Bridge. The Norfolk and Western Railway Bridge, 2.5 miles above the entrance, has a swing span with a clearance of 6 feet. (See **117.1 through 117.59 and 117.1007,** chapter 2, for drawbridge regulations.)

There are several shipyards along Eastern Branch: the largest floating drydock has a 3,200-ton capacity and handles vessels up to 316 feet; the largest marine railway has a 5,500-ton capacity and can handle vessels to 380 feet.

Southern Branch, the continuation of Elizabeth River south of the junction with Eastern Branch, is a part of the **Intracoastal Waterway** route southward to Albemarle Sound. The waterway is described at length in **United States Coast Pilot 4, Atlantic Coast, Cape Henry to Key West.**

The Federal project for Southern Branch provides for a channel 40 feet deep to the third bridge, thence 35 feet deep to the seventh bridge. The channel is maintained at or near project dimensions, and is well marked. (See Notice to Mariners and latest edition of the charts for controlling depths.)

A **speed limit** of 6 knots is prescribed by **162.55,** chapter 2, for that part of Southern Branch between Eastern Branch and the first bridge.

The Norfolk and Portsmouth Belt Line Railroad Bridge, 1.9 miles south of the junction with Eastern Branch and 9.9 miles from Sewells Point, has a vertical-lift span with a clearance of 6 feet down and 142 feet up. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) State Route 337 highway bridge, 0.2 mile southward of the Norfolk and Portsmouth Belt Line Railroad Bridge, has a vertical lift span with a clearance of 15 feet down and 145 feet up. The Norfolk and Western Railway Bridge, 10.9 miles from Sewells Point, has a vertical lift span with a clearance of 10 feet down and 135 feet up. (See **117.1 through 117.59 and 117.997,** chapter 2, for drawbridge regulations.)

U.S. Routes 13 and 460 highway bridge and the Norfolk and Western Railway Bridge, immediately to the southward, 13.1 miles from Sewells Point, have bascule spans with a least clearance of 7 feet. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) Large vessels must exercise caution when making the turns to these bridges because of the current.

The facilities on the east side of Southern Branch are mostly shipyards, oil terminals, and bulk-cargo piers, while Government installations front most of the west side.

The port facilities on the Berkley side of Southern Branch were described earlier in this chapter under Wharves, Norfolk Harbor.

The shipyard at Berkley has six piers that can accommodate vessels up to 1,200 feet. The largest floating drydock at the yard is 850 feet long over the keel blocks, 192 feet wide, 36 feet deep over the keel blocks, and has a lifting capacity of 54,250 tons. A marine railway with a capacity of 1,000 tons is available at the shipyard; cranes up to 67 tons are also available. The largest shaft the shipyard is able to produce is 100 feet by 30 inches.

The **Norfolk Naval Shipyard** is on the **Portsmouth** side of Southern Branch, 3.5 miles from Lamberts Point, and occupies about 2 miles of waterfront. There are naval **restricted** areas along this reach. (See **334.290,** chapter 2, for limits and regulations.)

Most of the oil terminals are at **Chesapeake,** on the east side of Southern Branch, 10 miles from Sewells Point and 28 miles from the Capes. These facilities, as well as the deep-draft bulk cargo, grain, chemical, and fertilizer piers and wharves, were described earlier in this chapter under Wharves, Norfolk Harbor.

10. CHESAPEAKE BAY, JAMES RIVER

This chapter describes the James River and several of its tributaries of which the Nansemond, Chickahominy, and Appomattox Rivers are the more important. Also discussed are the ports of Richmond and Hopewell, as well as several of the minor ports and landings on these waterways.

COLREGS Demarcation Lines.–The lines established for Chesapeake Bay are described in **80.510,** chapter 2.

Charts 12248, 12251.–James River rises in the Allegheny Mountains near Clifton Forge, Va., and flows 295 miles southeastward to Hampton Roads at Newport News, 21.5 miles by main channel from the Virginia Capes. The head of commercial navigation is at Richmond, 78 miles above the mouth. The river varies in width from 1,000 feet at Richmond to 4.3 miles at the mouth. Traffic consists chiefly of general cargo, chemicals, livestock, tobacco, and paper products. Drafts of vessels using the river above Newport News generally do not exceed 15 feet, but vessels drawing 24 feet or more navigate it occasionally.

Mileages shown in this chapter as Mile 0.9N, Mile 12W, etc., are the nautical miles above the mouth of James River; the letters N, S, E, and W denote by compass points the side of the river where each feature is located. Mile 0.0 is a point in the main channel on a line between Pig Point and Newport News Point; the midchannel point is 21.5 miles from the Virginia Capes.

Channels.–The Federal project for James River provides for dredging depths of 25 feet to the Richmond Deepwater Terminal and in the Richmond Deepwater Terminal Turning Basin, 74 miles above the mouth, thence 18 feet to and in the Richmond Harbor Turning Basin, 77 miles above the mouth, and thence 18 feet to the Richmond Lock at Richmond, 78 miles above the mouth. The river is well marked. (See Notice to Mariners and latest editions of the charts for controlling depths.)

Anchorages.–General anchorages extend for about 7 miles above the mouth. (See **110.1 and 110.168 (b) and (h),** chapter 2, for limits and regulations.)

Dangers.–Numerous stakes, piling, wrecks, and other obstructions are on both sides of the main channel in James River.

Tides.–The mean range of tide is 2.6 feet at Newport News and Hopewell, and 3.2 feet at Richmond.

Currents.–The currents in James River follow the general direction of the channel, except between Hog Island and Jamestown Island, 25 miles above the mouth, where they set across Goose Hill Flats. In the lower reaches, the velocity of flood is about equal to that of ebb. Near Richmond, the drainage flow predominates and the current seldom, if ever, sets upstream. These normal conditions are subject to change by wind and freshets.

During severe winters some drift ice appears, and at times the river freezes over, but navigation to Richmond hardly ever is suspended because the ice is broken up by a tug.

Freshets occur irregularly in the fall, winter, and spring; their height at Richmond ranges from 6 to 32 feet, though the latter is exceptional. The maximum freshet heights usually occur between the middle of March and the middle of April; the freshets occurring at other times usually reach heights not greater than about 6 feet above the normal high water. The number of freshets that cause the water to rise above the level of the wharves along the main channel at Richmond averages about one per year; the water seldom rises above the level of the city wharf. The flood heights diminish rapidly below Richmond; the extreme is about 11 feet less at Dutch Gap, and the rise is not felt at Hopewell. The cutoffs have reduced the freshet height at Richmond about 1 foot.

Pilotage on the James River is compulsory for all foreign vessels and for U.S. vessels under register in the foreign trade. Pilotage is optional for U.S. vessels in the coastwise trade which have on board a pilot licensed by the Federal Government to operate in these waters.

The Chesapeake and Interstate Pilots Association offers pilot services to vessels engaged in the coastwise trade and public vessels to any port or place on the James River. Arrangements for pilots may be made through ships' agents or the pilot office in Norfolk (telephone, 804-855-2733; cable, CINPILOT).

The Virginia Pilots Association offers pilotage to all vessels. Pilot service for the upper 38 miles of the river is available only during daylight. (See Pilotage, chapters 3 and 9.)

The principal places for **supplies** above Newport News are Hopewell and Richmond. **Repair** facilities are limited; small marine railways operate in Chuckatuck Creek, Pagan River, Appomattox River, and at Falling Creek.

Chart 12248.–The entrance to James River is between Pig Point (36°54.3′N., 76°26.5′W.) and **Newport News Point,** 3.6 miles to the north-northeastward; the midchannel point is 21.5 miles from the Virginia Capes and is close to the Newport News Wharves, described in chapter 9.

In May 1986, a **bridge-tunnel complex** (Interstate Route 664) crossing Hampton Roads connecting Newport News with Suffolk was under construction. The fixed bridge in the south section of the complex will cross a small boat channel; a design clearance of 30 feet is over the channel.

Nansemond River empties into the mouth of James River between Pig Point and **Barrel Point,** 2 miles to the west-northwest. Traffic on Nansemond River consists chiefly of pleasure craft. The river is used considerably by vessels with drafts of 9 feet and has been navigated with drafts of as much as 11 feet.

A narrow channel leads to Suffolk, 15 miles above the mouth of Nansemond River. In October 1978, the reported centerline controlling depth to Suffolk was 8 feet. The channel is well marked to Western Branch, 10 miles above the mouth. Local knowledge is necessary to navigate the narrow unmarked channel above Western Branch. A dam 0.5 mile above the bridge in Suffolk is the head of navigation.

The mean range of tide in Nansemond River is about 2.8 feet at the entrance and 3.8 feet at Suffolk. The current velocity is about 0.9 knot and follows the general direction of the channel.

Pig Point, on the south side of the entrance to James River and the east side of the entrance to Nansemond River, is the site of a community college and a manufacturing plant. In 1982, an unmarked channel leading to a pier at Pig Point had a reported controlling depth of 2 feet; in November 1984, the channel was not maintained. The twin tanks 0.4 mile east of the pier are prominent. The submerged pilings of an old pier extend northward 0.7 mile from the vicinity of the tanks and are marked at the outer end by a daybeacon.

From Pig Point to Hollidays Point, 6.5 miles upstream, Nansemond River is wide, but the channel is crooked and leads between extensive shoals that are almost bare at low water in some places. There are many fish stakes on the shoals near the mouth. Above Hollidays Point, the river is narrow and crooked, but the midchannel is clear to Suffolk.

The highway bridge over Nansemond River at **Town Point,** on the south side 2.4 miles above the mouth, has a bascule span with a clearance of 20 feet at the center. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) In 1980, a fixed highway bridge with a design clearance of 65 feet was under construction immediately east of the existing bridge; when completed it will replace the existing bridge. An overhead power cable with a clearance of 96 feet over the main channel crosses the river about 0.8 mile above the bridge. About 0.6 mile eastward of the bridge, a marked narrow channel with a controlling depth of 5 feet in 1959, leads southward into **Bennett Creek** . In August 1981, shoaling to 1 foot was reported in the narrow entrance channel. The creek has deeper water inside to the fixed highway bridge, which has a clearance of 20 feet. Gasoline is available at a small-boat basin just below the bridge.

Great Shoal, on the northwest side of the channel 1 mile up Nansemond River from the bridge, has an oyster bar that bares ½ foot at low water; it is marked by bush stakes.

The highway bridge over the river at **Hollidays Point,** on the north side 6.5 miles above the mouth, has a swing span with a clearance of 7 feet. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.)

Western Branch empties into the west side of Nansemond River, about 10 miles above the mouth. In 1983, the branch had a controlling depth of 1½ feet for about 0.7 mile above the mouth, thence in 1974-1977, a midchannel controlling depth of 2 feet was available to the fixed highway bridge at **Reids Ferry,** 1.6 miles above the mouth. The channel entrance is marked by daybeacons for about 700 feet above the junction with the Nansemond River. A seasonal marina, 0.7 mile from the main Nansemond channel, has a pier with a depth of about 10 feet at the face. Gasoline, diesel fuel, a 45-foot marine railway, and a 4-ton lift are available. Minor repairs can be made. In 1967, a submerged obstruction was reported near the mouth of Western Branch in 36°47′20″N., 76°33′47″W.

A fixed highway bridge with a clearance of 35 feet crosses the Nansemond River, about 12.5 miles above its mouth.

Suffolk is an important rail center on the south side of Nansemond River, 15 miles above the mouth. The highway bridge at Suffolk has a bascule span with a width of 40 feet and a clearance of 4½ feet. (See **117.1 through 117.59 and 117.1017,** chapter 2, for drawbridge regulations.) The overhead power and telephone cables at the bridge have a clearance of 40 feet.

Batten Bay, on the west side of James River just north of Nansemond River, has general depths of 2 to 6 feet. **Ragged Island Creek,** at the north side of the bay, is shallow and little used.

Chuckatuck Creek, which empties into Batten Bay from southwestward, has depths of about 4 feet in the approach through the bay and deeper water inside for about 1.7 miles. The channel over the bar and through the bay is marked by lights, buoys, and daybeacons; the channel edges usually are marked by bush stakes.

The highway bridge over Chuckatuck Creek, 0.8 mile above the mouth, has a bascule span with a clearance of 21 feet. (See **117.1 through 117.59 and 117.1005,** chapter 2, for drawbridge regulations.) In August 1987, a replacement fixed bridge with a design clearance of 35 feet was under construction immediately northeast of the bascule bridge. A small shipyard is at **Crittenden** , on the south side of the creek just eastward of the bridge; berths, gasoline, diesel fuel, ice, and some marine supplies are available. All types of repairs can be made; a marine railway there can handle craft up to 75 feet long.

James River Bridge, Mile 4, extends 4 miles from shore to shore in a northeast-southwest direction. The main channel vertical-lift span, 1 mile from the northeast shore, has a clearance of 50 feet down and 145 feet up. The bridgetender monitors VHF-FM channel 13; call sign KQ-7169. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) A fixed span midway between the two shores has a clearance of 22 feet. The overhead power cable crossing the river close northward of the bridge has a clearance of 172 feet at the lift span and 100 feet at the fixed span. Both of the piers that protect the two cable suspension towers just north of the lift span are marked by three fixed red lights.

In 1981, a highway bridge was under construction parallel to and 80 feet southeast of the James River Bridge. The vertical lift span over the main channel has a design clearance of 50 feet down and 145 feet up; the fixed span midway between the two shores has a design clearance of 25 feet. Upon completion, it will replace the existing bridge.

Mariners' Museum, Mile 6E, is at the western side of **Lake Maury.**

White Shoal, on the southwest side of the main channel at Mile 7, is marked near its southeast end by the tower of an abandoned lighthouse. A secondary channel on the opposite side of the shoal also is marked.

Pagan River empties into James River at Mile 7W. Traffic on this river consists chiefly of shellfish, sand, and gravel. In June 1971, the controlling depth was 3½ feet for a midwidth of 60 feet to Smithfield.

The approach to Pagan River through the dredged channel southeast of White Shoal is well marked; the river inside is also marked to within 1 mile of Smithfield. The mean range of tide is 2.8 feet at the entrance.

Jones Creek, on the south side of Pagan River 0.7 mile above the mouth and marked by a light and a daybeacon at the entrance, has depths of about 2 feet or more across the flats at the entrance. The fixed highway bridge, 0.6 mile above the mouth, has a width of 30 feet and a clearance of 8 feet. An overhead power cable close southward of the bridge has a clearance of 32 feet. A marina and fish pier are at **Rescue,** just below the bridge; some supplies, fuel, and a 30-ton mobile hoist are available; repairs can be made. A 45-foot marine railway is 100 yards above the bridge. The fixed highway bridge, 2.5 miles above the mouth, has a width of 40 feet and a clearance of 7 feet.

Battery Park is on the south side of Pagan River 1 mile above the mouth. Hull and engine repairs can be made at the town, in a boatyard 150 yards above the oyster plant.

Cypress Creek, on the south side of Pagan River 4 miles above the mouth, has depths of 4 feet or more for 2 miles. The fixed highway bridge over the entrance has a clearance of 12 feet. An overhead power cable with a clearance of 36 feet crosses the creek about 0.8 mile above the bridge. A fixed highway bridge, with a clearance of 16 feet for a width of 46 feet, crosses the river about 1.1 miles above the mouth.

Smithfield, on the southwest side of Pagan River 4.5 miles above the mouth, is famous for its hams. The fixed highway bridge just above the town has a width of 30 feet and a clearance of 15 feet. An overhead power cable at the bridge and one 0.4 mile west of the bridge have clearances of 30 feet. A fixed highway bridge, with a clearance of 16 feet

for a width of 48 feet, crosses the river about 0.6 mile above the fixed highway at Smithfield.

Deep Creek, Mile 8E, is used as an overnight anchorage by many oyster boats. A dredged marked channel leads from James River to a turning basin opposite Menchville. In February 1985, the controlling depths were 6½ feet from the channel entrance to Daybeacon 11, then in February 1985-April 1986, 7 feet in the northwest half of the channel to the basin with shoaling to bare in the southeast half, and then 8 feet in the basin with lesser depths along the western and southern limits. Traffic consists of some shellfish, sand, and gravel.

Menchville is on the northwest side of the entrance to Deep Creek. The landings at the town have depths of about 5 feet alongside; gasoline and diesel fuel are available. Numerous pleasure craft use Deep Creek during the summer. Gasoline, supplies, and a 12-ton lift are available on the east side about 0.5 mile above the mouth.

Warwick River, marked by daybeacons to a point about 3 miles above the mouth, is entered just north of Deep Creek; depths of 4 feet or more can be carried to **Fort Eustis,** 7 miles above the mouth. The mouth of the river is sometimes used as an anchorage by small oyster boats.

Point of Shoals, Mile 12W, is an extensive shallow area in **Burwell Bay.** There are also wide areas of unmarked shoals between the channel and the northeastern shore. The main channel formerly circled around Point of Shoals, but is now through the dredged cut known as **Rocklanding Shoal Channel.** The old channel has shoaled, but is still buoyed; the current velocity is 0.9 knot. The several small landings along the shore of Burwell Bay have depths of about 4 feet at their outer ends.

Burwell Bay is used as an anchorage for a **Maritime Administration Reserve Fleet.** (See **162.270,** chapter 2, for regulations **restricting navigation** in the vicinity of the decommissioned ships.)

A small-craft harbor of refuge is on the west side of Burwell Bay at **Tylers Beach** (37°04.9′N., 76°40.0′W.). A dredged channel, marked by lights and daybeacons, leads from James River to the harbor basin. In April-May 1984, the channel had a midchannel controlling depth of 5 feet, thence the basin had depths of 6 feet. Limited float space is available in the basin. An overhead power cable at the entrance to the basin has a clearance of 37 feet.

At Mile 16.2E, a privately maintained channel, marked by a **075°** lighted range, lights, daybeacons, and a buoy, leads from James River to a boat basin of the U.S. Maritime Administration reservation at **Fort Eustis.** In 1980, the channel and basin had a reported controlling depth of 9½ feet. The ruins of an army pier are visible close northward of the channel. Decommissioned ships are moored on either side of the channel.

Deep Water Shoals Light (37°08.9′N., 76°38.2′W.), Mile 16.9E, 34 feet above the water, is shown from a skeleton tower with a red and white checkered rectangular daymark on piles, in depths of 2 feet. A seasonal fog signal is at the light.

Skiffes Creek, Mile 17.8E, has a private channel at the entrance leading to an army pier and turning basin, and to a small-boat basin to the northward. The channel is marked by a lighted and unlighted buoys, a directional light and daybeacons. In August-September 1982, a controlling depth of 13 feet was available to the turning basin except for a 3-foot shoal spot on the north edge of the channel between Buoys 7 and 9; thence depths of 12 to 18 feet were in the turning basin except for shoaling near the south limit, 15 feet alongside the pier, and 12 to 18 feet in the small-boat basin except for shoaling near the north limit.

A **restricted area** is at the entrance to the Skiffes Creek channel. (See **334.280,** chapter 2, for limits and regulations.)

A privately marked barge channel with a reported depth of 12 feet in 1978 leads to the Surry Nuclear Power Plant on the west side of James River opposite Skiffes Creek. The nuclear powerplant is operated by the Virginia Electric and Power Co. A 120-foot-high nuclear reactor tower at the station is prominent from all directions on the river.

College Creek, Mile 22.5N, has depths of 1 foot across the flats at the mouth, 4 feet inside for 2 miles, thence 2 feet for 0.5 mile to **Williamsburg Landing,** 1 mile from the town of **Williamsburg.** The creek is difficult to navigate without local knowledge. Fixed bridges across the creek at the mouth and about 4 miles above the mouth have clearances of 10 and 12 feet, respectively. Private aids mark the creek.

Cobham Bay, a wide bight at Mile 25.6S, has general depths of 5 to 7 feet.

Jamestown Island, at Mile 26N, is the site of historic **Jamestown,** which was settled by Capt. John Smith and his 105 cavaliers in 1607. The town is on **Church Point,** Mile 28N, the northwest end of the island. The Jamestown white monument is prominent; the ruins of the old church are hidden by trees.

The Thorofare, Back River, and **Sandy Bay** separate Jamestown Island from the mainland and form a small-craft passage that connects at each end with James River. The Thorofare is a shallow bay on the northeast side of the island. Back River is a narrow, winding channel that extends from the head of The Thorofare along the north side of the island to Sandy Bay, which opens into the James River. A narrow channel marked by daybeacons leads through the extensive mudflats in the upper part of The Thorofare. The controlling depths are about 2 feet through The Thorofare, thence 4 feet through Back River and Sandy Bay to the highway bridge that crosses its mouth, and thence 2 feet across the bar to deep water in James River. In 1971, extensive shoaling was reported on the bar. The highway bridge across the mouth of Sandy Bay has a 48-foot fixed span with a clearance of 12 feet. A small island about 200 yards northeastward of the bridge should be left to northward. An overhead power cable near the west end of Back River has a reported clearance of 30 feet.

Mill Creek, which empties into The Thorofare from the northward, has a depth of 1 foot at the entrance and 2 or more feet to a landing 1.5 miles above the mouth. Above the landing, the creek is foul with snags and obstructions. The fixed highway bridge across the mouth of the creek has a clearance of 10 feet.

Powhatan Creek, used by fishermen and small pleasure craft during the summer, empties from the northward into Sandy Bay. The mouth of the creek is about 0.3 mile above the highway bridge that crosses the mouth of Sandy Bay. The bridge has a width of 48 feet and a clearance of 12 feet. In April 1970, depths of 4 feet were reported at the mouth of the creek, thence 6 feet to a marina near the highway bridge about 0.4 mile above the mouth. The fixed bridge has a width of 25 feet and a clearance of 12 feet. A current is reported noticeable at both bridges. Gasoline, water, some marine supplies, and a 17-ton lift are available at the marina; minor hull and engine repairs can be made. The numerous snags along the banks of the creek can be avoided by staying in midstream, and the island 0.3 mile above the mouth should be left to the northward.

The approach to Powhatan Creek through Sandy Bay is marked by daybeacons and uncharted stakes, but local knowledge is required to carry the best water. In July 1984, severe shoaling was reported in the channel through the basin.

Chart 12251.–Scotland (37°11.0′N., 76°47.2′W.), Mile 27.5S, is the mainland terminus of the Jamestown Ferry, which operates to **Glass House Point,** 1 mile northwest of the monument at Jamestown, across the river. Ferry slip depths are about 11 feet on the Scotland side and 20 feet on the Jamestown side. The pier at Scotland extends channelward for 700 feet, and at Glass House Point, marked by lights and a fog signal, for 1,600 feet. The partly submerged remains of the old Scotland wharf are about 100 yards southeast of the slips.

Grays Creek, Mile 28.2S, is entered through a shallow bay. A 3-foot channel leads to deeper water inside. There are many snags and obstructions in the creek. A marina is 1 mile above the mouth.

Chickahominy River, Mile 33N, has a controlling depth of 6 feet in the entrance channel, thence 10 feet or more to the head of tidewater navigation at Walkers Dam 19 miles above the mouth. The lock in the dam has a length of 60 feet, a width of 15 feet, and a depth of 4 feet over the sill. The lock gates are hand operated; there is no tender. It is recommended that at least two strong persons be on board before attempting to use the lock. Obstruction lights mark the dam spillway.

The seasonally buoyed channel through the broad flats at the entrance to Chickahominy River is entered 0.7 mile westward of Glass House Point; daybeacons and seasonal buoys mark the critical points inside. The river is used by fishermen and pleasure boatmen. The mean range of tide is 1.9 feet at the entrance.

Wharf ruins extend out about 200 yards from shore 0.5 mile above **Barrets Point,** on the east side of the entrance. A sunken barge lies on the eastern edge of the channel 0.8 mile above the point.

Barrets Ferry highway bridge, 1.3 miles above the mouth, has a swing span with a clearance of 12 feet. (See **117.1 through 117.59 and 117.1003,** chapter 2, for drawbridge regulations.) A pier with a depth of 7 feet at the face extends 100 yards into the river from the east bank just north of the bridge.

Wright Island Landing, on the east side of Chickahominy River 6.5 miles above the mouth, has a fish wharf with 10 feet at the face; the buildings at the wharf are prominent from downstream. **Shipyard Landing** is on the same side of the river about 500 yards above Wright Island Landing. A marina at **Brickyard Landing,** on the north side of the river about 2.5 miles above Wright Island Landing, can provide gasoline and some supplies.

An overhead power cable with a clearance of 44 feet crosses the river about 9.4 miles above the mouth.

The Thorofare is an unmarked cut leading through the bend of the river 10 miles above the mouth; the controlling depth is 5 feet. Small boats able to pass through the cut can save 1.2 miles.

A small marina on the west side 11 miles above the mouth, just north of **Mt. Airy,** has a depth of 9 feet at the face. Gasoline and some supplies are available.

Lanexa, on the east side 15 miles above the mouth, has a marina with reported depths of 10 feet alongside. Gasoline and supplies are available. Hull and engine repairs can be made; a 70-foot marine railway and a 10-ton mobile lift are at the marina.

The former ferry slip and piers at **Claremont,** Mile 37.5S, are in ruins, and the bottom area to the southeastward near **Sloop Point** (37°13.8′N., 76°57.0′W.) is foul. The former ferry slip across the river at **Sandy Point** is also in ruins.

Upper Chippokes Creek, Mile 38.5S, has depths of about 5 feet for 3 miles, thence 2 feet for 1 mile to the head of navigation. The channel into the creek is close along the south bank. An overhead power cable about 3.5 miles above the mouth has a clearance of 56 feet. A wreck, marked by a light, is off the creek entrance close to the southwest side of James River main channel; the wreck extends about 2 feet above high water.

Brandon wharf, Mile 39.3W, is a private landing with depths of 20 feet alongside.

Sturgeon Point, Mile 42.5N, is the site of an abandoned brickyard.

Wards Creek empties into James River at Mile 46S. A depth of 2 feet can be carried across the mudflats at the entrance by following the east bank at a distance of about 75 yards. Above the mouth, depths are 4 to 10 feet for 1.7 miles. The creek is an excellent storm anchorage for any boat able to enter.

Fort Powhatan (37°16.2′N., 77° 04.6′W.) is at Mile 46.8S.

Ruffins Wharf, Mile 48.2E, has depths of about 16 feet at the face.

An overhead power cable, with a clearance of 180 feet at the main channel, crosses the river at **Windmill Point,** Mile 49.9S.

Willcox Wharf, Mile 50N, is in poor condition. The far end of the pier is in ruins.

Powell Creek, Mile 53S, has depths of 7 feet through a narrow channel across the mudflats at the entrance and for 2 miles upstream. The creek is a good storm anchorage.

A highway lift bridge with a clearance of 50 feet down and 145 feet up crosses the James River at **Jordan Point,** Mile 56.4S. The bridgetender monitors VHF-FM channel 13; call sign KQ-7167. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) Effective August 31, 1978, the Captain of the Port, Hampton Roads, directed that the bridge be closed to all vessels with a vertical height in excess of 45 feet from 8 p.m. until 6 a.m. nightly.

Jordan Point Marina, on the east side of Jordan Point at the south end of the bridge, may be reached through a channel marked by private piles. Berths, gasoline, diesel fuel, water, electricity, and some marine supplies are available.

Chart 12251.–Hopewell, Mile 59W, is the site of several industries and the terminus of a branch railroad to Petersburg. The Allied Chemical Co. Pier (37°18′26″N., 77°16′00″W.), about 0.8 miles southeastward of **City Point,** is 575 feet long and has berthing on both the north and south sides. The pier is used for receipt of petroleum products and liquid chemicals, and shipment of aluminum sulfate. In 1980, depths of 26 feet were reported alongside.

The Continental Can Co. Pier, 650 yards southward of the chemical pier, has a 20-foot face with 210 feet of berthing space with dolphins. The pier is used by petroleum barges. In 1980, depths of 27 feet were reported alonside.

A barge wharf that receives sand and gravel is 750 yards southeast of City Point. An oil terminal T-head pier with 175 feet of berthing space with dolphins and 25 feet reported alongside is 190 yards southeastward of the barge wharf. Limited amounts of supplies can be obtained in Hopewell.

Appomattox River, Mile 59.5W, is navigable to a small-boat harbor on the east side, about 7.5 miles above the entrance. In April-June 1985, the midchannel controlling depth was 8 feet to a basin on the east side of the river, about 7 miles above the entrance, thence 2 to the small-boat harbor, about 7.5 miles above the entrance. The river is not maintained above the small-boat harbor; local knowledge is advised. The difficult part of the channel through the flats at the mouth is marked by a buoy, lights and daybeacons; a general midchannel course is best through the remainder of

the navigable part of the river. In January 1980, shoaling to an unknown extent was reported in about 37°19′13″N., 77°16′53″W., in the vicinity of Buoy 1. In May 1981, a pile was reported in about the middle of Appomattox River about 100 yards east of the highway bridge.

The highway bridge, 1.2 miles above the mouth of Appomattox River, has a fixed span with a clearance of 40 feet. The Hopewell Yacht Club, on the south side 0.2 mile west of the bridge, has a small-boat basin with depths of about 6 feet off the T-pier. Gasoline, diesel fuel, and some supplies are available. Hull, engine, and radio repairs can be made; marine railway, 60 feet, mobile hoist, 50 tons.

The railroad bridge, 2.4 miles above the mouth, has a swing span with a clearance of 10 feet. (See **117.1 through 117.59 and 117.995**, chapter 2, for drawbridge regulations.) An overhead power cable 0.8 mile above the bridge has a clearance of 113 feet.

At the small-boat harbor, 7.5 miles above the entrance of Appomattox River, some supplies and berths are available; gasoline and diesel fuel can be obtained by truck. Repairs can be made; marine railway, 100 feet.

A conveyor belt with a 50-foot movable span and an overhead clearance of 11 feet crosses the river 8.1 miles above the mouth.

The channel in Appomattox River is blocked at Petersburg by a dam. A diversion channel joins the river below the dam with the river above the dam. Their lower junction is about 2.9 miles below the dam; the upper junction is immediately above the dam. An overhead power cable 0.2 mile below the dam has a clearance of 51 feet.

Petersburg, about 10 miles above the mouth of Appomattox River, is an important rail center. The bulkheads at the city are in poor condition. Fuel and supplies are not available at the waterfront, but all kinds of small-craft supplies may be obtained in the city.

Above its junction with Appomattox River, James River becomes narrow and winding. The bends are often referred to as the **Curles of the River,** and the 14-mile section from Hopewell to Wilton has been called **The Corkscrew.**

Turkey Island Bend, 2 miles north of Hopewell, has depths of 10 to 30 feet around its 6-mile length, but is seldom used except by pleasure boats because the main channel now leads northwestward through Turkey Island Cutoff; most of the landings along the bend are in ruins. The north and west sections of the bend afford excellent anchorages, because the river current has been greatly diminished by the cutoff and winds from any direction have little effect; the bottom is mostly soft mud.

Turkey Island Cutoff, Mile 61, is 1 mile long and well marked by lights.

Cable ferry.–A cable ferry crosses the lower part of Turkey Island Cutoff at Mile 61.1, providing vehicular access to Turkey Island, which is a National Wildlife Refuge. The single cable is moored ashore at both sides; when the self-propelled barge is underway, the cable is picked up to the deck level of the barge, which is about 3 feet above the water, and then dropped astern. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

Jones Neck Cutoff, Mile 64, extends about 1 mile northward and westward; the cutoff is well marked by lights. The old river bend around **Jones Neck** has depths of 13 to 44 feet along its 4.5-mile length, but is now little used; most of the landings are in ruins.

Dutch Gap, Mile 66.5, the first canal dug in the United States, was cut through in 1611. The main channel extends west-northwestward through **Dutch Gap Cutoff (Aiken Swamp-Dutch Gap Cutoff),** which is about a mile long and is marked by lights at both ends. There is a gravel basin in **Hatcher Island,** on the north side of the cutoff.

The old river bend around Hatcher Island has depths of 7 to 25 feet along its 2-mile length. **Richmond Yacht Basin,** north of Hatcher Island, has piers with depths of about 12 feet at their outer ends. The preferred passage is east of Hatcher Island. In 1980, it was reported that the passage west of Hatcher Island required local knowledge. A small marine railway at the yacht club can handle boats up to 40 feet for repairs; gasoline is available. A fixed highway bridge over the western entrance to the bend has a width of 40 feet and a clearance of 21 feet.

The old channel southward from Dutch Gap has depths of 9 feet or more for over 1 mile to the gravel basin in **Farrar Island.**

A concrete-and-steel wharf of the Virginia Electric and Power Co. (37°22′57″N., 77°22′44″W.), at Mile 67.5S, has main channel depths at the face. A privately maintained light is shown from the end of the wharf. The overhead cable just above the wharf has a clearance of 165 feet. About 300 yards westward is another cable with a clearance of 166 feet.

A small-boat basin is at Mile 68.6N. In June 1980, depths of 6 feet were reported in the basin. Berths, gasoline, and limited supplies are available. Repairs can be made; marine railway, 45 feet. A chemical plant pier at Mile 71.3S has depths of 20 feet alongside.

The oil wharf at **Drewrys Bluff,** Mile 71.7W, has 350 feet of berthing space with dolphins and main channel depths at the face. Vessels are requested to reduce speed when passing the wharf.

Falling Creek (37°26.2′N., 77°25.7′W.) enters James River at Mile 72.4W.

Richmond, the capital of Virginia, is at Mile 78E. Traffic to and from the city consists chiefly of petroleum products, sand and gravel, general cargo, and tobacco. Commercial navigation in the river proper ends at the city wharves, but small boats can go 1 mile farther. The turnpike fixed highway bridge just below **Mayos Island** has a clearance of 40 feet.

Weather.–Richmond's climate might be classified as modified continental. Summers are warm and humid and winters generally mild. The mountains to the west act as a partial barrier to outbreaks of cold, continental air in winter, the coldest air being delayed long enough to be modified, then further warmed as it subsides in its approach to Richmond. The open waters of the Chesapeake Bay and Atlantic Ocean contribute to the humid summers and mild winters. The coldest weather normally occurs in late December and in January, when low temperatures usually average in the upper twenties and the high temperatures in the upper forties. Temperatures seldom lower to zero.

Precipitation is rather uniformly distributed throughout the year. However, dry periods lasting several weeks do occur, especially in autumn when long periods of pleasant, mild weather are most common. There is considerable variability in total monthly amounts from year to year so that no one month can be depended upon to be normal. Snow has been recorded during 7 of the 12 months. Snowfalls of 4 inches or more occur on an average of once a year. Snow usually remains on the ground only 1 or 2 days at a time. Ice storms (freezing rain or glaze) are not uncommon in winter, but they are seldom severe enough to do any considerable damage. The James River reaches tidewater at Richmond where flooding has occurred in every month of the year, most frequently in March (28 times in the past 61 years), and only twice in July. Hurricanes and less severe storms of tropical origin have been responsible

for most of the flooding during the summer and early fall. Damaging storms occur mainly from snow and freezing rain in winter and from hurricanes, tornadoes, and severe thunderstorms at other seasons. Damage may be from wind, flooding, or rain, or from any combination of these. (See page T–8 for **Richmond climatological table.**)

The National Weather Service maintains an office at Byrd Field; **barometers** can be compared there or checked by telephone.

Towage.–A city-owned tug, 500 hp, is available for docking and undocking, if desired.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Richmond-Petersburg is a **customs port of entry.**

The Port of Richmond's **harbormaster** maintains an office at the Richmond Deepwater Terminal at Warwick. He is responsible within the port for the assignment of berths and anchorages and the use of the city-owned tug.

Wharves.–Only the city-owned facilities at the Port of Richmond are described. These facilities include Richmond Deepwater Terminal and the Richmond Upper Marine Terminal; turning basins front both facilities. The terminals are served by trunk railway and major highways, and have water and electric shore-power connections. All types of fuel can be obtained by tank truck. The alongside depths given for each facility described are reported depths. (For the latest controlling depths, contact the operator.)

Richmond Deepwater Terminal: at **Warwick** (37°27.4′N., 77°25.3′W.), Mile 74W; 1,250-foot marginal wharf; 25 feet alongside; deck height, 22 feet; livestock pens; 240,000 square feet of covered storage, 60,000 square feet of bulk storage space, and 10 acres of open storage; 200-ton crawler crane; forklifts and cranes up to 90-ton capacity; facility handles bulk, general, and containerized cargo and livestock; operated by Richmond Waterfront Terminals.

Richmond Upper Marine Terminal: on the east side of James River, about 4 miles northward of the Deepwater Terminal; 750-foot marginal wharf; 18 feet alongside; deck height, 12 feet; 80,000 square feet of warehouse and transit space; not in operation in 1980.

There are eight oil barge wharves and two barge wharves that handle gravel and construction material at Richmond. Most are on the west bank between Falling Creek and across from Richmond Upper Marine Terminal.

Supplies.–Gasoline and diesel fuel are available by tank truck. Some marine supplies may be obtained in Richmond, but major supplies must be obtained in the Hampton Roads area.

Repairs.–There are no drydocking or major repair facilities in the Port of Richmond; the nearest such facilities are in the Hampton Roads area.

The **Kanawha Ship Canal,** at the north end of the Richmond waterfront, is reached through a masonry lock with a length of 156 feet, a width of 35 feet, and a vertical lift of 23 feet; the lock is operated by hand from 0800 to 1600, Monday through Friday. A 24-hour advance notice to the Port of Richmond harbormaster is required. The canal is said to have depths of about 12 feet, but is now little used except by small private boats. The railroad bridge about 150 yards above the lock has a 30-foot bascule span with a clearance of about 2 feet; 8 hours′ advance notice to the harbormaster is required to open the span.

11. CHESAPEAKE BAY, YORK AND RAPPAHANNOCK RIVERS

This chapter describes the western shore of Chesapeake Bay from Old Point Comfort to the Potomac River including its principal tributaries Back, Poquoson, York, Piankatank, Rappahannock, and Great Wicomico Rivers, and Mobjack Bay. Also discussed are the ports of Yorktown, Fredericksburg, West Point, Tappahannock, Kilmarnock, and Reedville, as well as several of the smaller ports and landings on these waterways.

COLREGS Demarcation Lines.–The lines established for Chesapeake Bay are described in **80.510,** chapter 2.

Charts 12221, 12225.–The western shore of Chesapeake Bay from Old Point Comfort to the Potomac River is mostly low. York and Rappahannock Rivers are broad and deep at their entrances and are navigable for long distances.

Fishtraps are thicker in this area than in any other part of the bay. **Ice** is seldom encountered this far south in the bay, but may be found in the upper parts of some of the tributaries.

Channels.–The Federal project for Chesapeake Bay provides for depths of 50 and 42 feet in the main channel between the Virginia Capes and Fort McHenry, Baltimore. There are three dredged sections in the lower Chesapeake Bay: the first off Cape Henry, just above the Virginia Capes (50 feet); the second off York Spit, 11 to 22 miles above the Capes (42 feet); and the third off Rappahannock Spit, 40 to 46 miles above the Capes (42 feet); they are well marked. (See Notice to Mariners and latest editions of the charts for controlling depths.)

York Spit Channel begins 11 miles above the Capes and extends northward another 11 miles. The current velocity is about 1.0 knot in the channel.

Chart 12222.–Horseshoe is a shoal that extends several miles out from the shore between Old Point Comfort and Back River, 6.5 miles to the northward. The southern edge of the shoal lies along the north side of the main channel into Hampton Roads; the eastern half has depths of 13 to 18 feet, and the western half, 6 to 11 feet. Local vessels drawing 7 feet or less use the lanes through the fishtraps on the Horseshoe when navigating between Hampton Roads and York River or Mobjack Bay. The tidal current velocity is 0.5 knot over the Horseshoe and is rotary, turning clockwise.

A naval **restricted area** extends eastward and southward of Old Point Comfort, and a **danger zone** of the **Fort Monroe** firing range extends to seaward from a point 1.5 miles northward of the point. (See **334.350 and 334.360,** chapter 2, for limits and regulations, respectively.)

Back River empties into the west side of Chesapeake Bay 7 miles northward of Old Point Comfort between **Northend Point** and **Plumtree Island,** 1 mile to the northward. A firing and bombing **danger zone** is north of the entrance to Back River. (See **334.340,** chapter 2, for limits and regulations.) The approach to Back River, from southeastward through a lane in the fishtraps, is well marked. The mean range of tide is 2.3 feet at the entrance.

About 2 miles above the mouth, Back River divides into **Northwest Branch** and **Southwest Branch,** which have general depths of 2 to 5 feet. The **Langley Field** hangars, water tanks, and wind tunnel back of Willoughby Point, between the branches, can be seen for many miles. In 1979, the marked channel that extends 3 miles from the mouth of the river to the Langley Field fuel pier on the west side of Southwest Branch had a controlling depth of about 12 feet. In August 1982, shoaling to 3 feet was reported on the south side of the channel about 150 yards east-northeastward of Light 9. In December 1985, a bare shoal was reported to extend about 60 feet north of Light 9. The Langley Yacht Club, just south of the fuel pier, has gasoline and supplies; the depth in the basin is about 4 feet. A marked side channel to the Langley Field boathouse, on the south side of Northwest Branch 3 miles above the river mouth, has a controlling depth of about 7 feet.

A marina on the south side of Back River, just east of **Windmill Point** 1 mile above the mouth, has gasoline, diesel fuel, and supplies; marine railways can handle boats up to 40 feet. The reported depth to the marina is about 6½ feet.

Harris River, on the south side of Back River west of **Windmill Point,** has depths of 6 feet in a marked channel that leads to a marina inside **Stony Point.** Some supplies, gasoline, diesel fuel, and berths are available. Repairs can be made; mobile lift, 20 tons.

Messick Point is on the north side of Back River, 1.5 miles above the mouth.

The side-by-side highway and rail bridges over Southwest Branch, 1.5 miles above Willoughby Point, have fixed spans with a minimum width of 18 feet and a clearance of 6 feet.

Between Back River and Poquoson River are shoals that extend 1 to 3 miles from shore; on the shoals are scattered oyster rocks that bare, or nearly bare, at low water. Strangers should stay outside the 6-foot curve. A buoyed lane, about 0.6 mile outside the 6-foot curve, extends northwestward through a fishtrap area from about 2.4 miles east-southeast of Northend Point to about 1.6 miles west-southwest of York Spit Light. In September 1980, poles were reported in the lane in about 37°09′54″N., 76°16′21″W., 37°10′45″N., 76°16′42″W., and 37°10′51″N., 76°16′48″W.

Chart 12238.–Poquoson River, which empties into Chesapeake Bay 5 miles northwest of Back River, has depths of 7 feet to the village of **Yorkville,** on the west side 2.5 miles above the mouth. The marked approach to the river is from northeastward and is clear of fishtraps for a width of 400 yards. There is a light on either side of the entrance. The mean range of tide is 2.4 feet.

Bennett Creek, on the southeast side of the Poquoson River mouth, has depths of 6 feet or more for 1.3 miles to **Easton Cove,** which makes off to the eastward. The channel is marked as far as White House Cove, on the west side of Bennett Creek 0.8 mile above the mouth; the channel in White House Cove is marked by two daybeacons and has depths of 8 to 2 feet for 0.7 mile above the mouth. A 50-ton mobile hoist at the basin on the north side of the cove entrance can handle boats for hull repairs. Gasoline and diesel fuel are available at a marina near the south end of the cove. A "no wake" **speed limit** is in effect in White House Cove.

Chisman Creek, on the north side of the Poquoson River mouth, has depths of 9 feet or more in a narrow channel for 1.3 miles above its entrance. There are boatyards on the south side, 1 mile above the entrance; gasoline is available; the largest marine railway can handle boats up to 100 feet for hull repairs. The creek is marked by daybeacons and a light.

Back Creek, 1.5 miles south of York River, has depths of 7 feet for 2 miles. The entrance is marked by lights and daybeacons. The creek is used by oystering and fishing boats. A State-owned wharf on the south side, 1.4 miles above the mouth, has a depth of about 9 feet at the face. Gasoline, diesel fuel, limited berthing, and some supplies are available at a marina on the south side, 1.8 miles above the mouth; repairs can be made.

Passage northward from Back Creek to York River can be made through the **Thorofare,** about 0.8 mile from the mouth of Back Creek. In January-February 1980, the dredged channel, marked by lights and daybeacons, had a midchannel controlling depth of 3½ feet.

Charts 12238, 12241, 12243.–York River formed by the junction of Mattaponi and Pamunkey Rivers 29 miles about the mouth, is 15 miles northward of Old Point Comfort and 26 miles by the main channel from the Virginia Capes. Traffic on York River consists chiefly of pulpwood, petroleum products, military supplies, and shellfish. Drafts of vessels using the river are mostly 18 feet or less, but deep-draft vessels navigate the lower reaches.

York River has a broad and fairly straight channel, is well marked and easily followed. Depths are as much as 80 feet off Yorktown. In 1982, the controlling depth in the dredged sections of the river was 18 feet to West Point. Vessels can anchor in the wider parts of York River channel aside from the naval areas described later.

The mean range of tide is 2.2 feet at the entrance to York River, 2.4 feet at Yorktown, and 2.8 feet at West Point. The currents in York River follow the general direction of the channel except in the narrowest parts where there is a tendency to set a vessel onto the shoals. The velocity varies throughout the river; the times of slack water and strengths of current become later going up the river. The normal conditions are subject to change by winds and freshets.

Ice sometimes interferes with navigation of York River for short periods during severe winters, but in ordinary winters there is no interruption below West Point.

Caution.–Ships and craft underway in York River are to proceed at reduced speed and exercise extreme caution in order to reduce generated water motion and to prevent damage to the Virginia Fisheries Laboratory equipment and facilities located downstream from the Coleman Memorial Bridge, in the vicinity of Gloucester Point, ships and craft loading volatile fuels at the American Oil Co. refinery pier, and other craft and property close to the shores of the river. In no instance should the **speed** of ships underway upriver from the Tue Marshes Light exceed 12 knots.

Pilotage on the York River is compulsory for all foreign vessels and for U.S. vessels under register in the foreign trade. Pilotage is optional for U.S. vessels in the coastwise trade which have on board a pilot licensed by the Federal Government to operate in these waters.

The Chesapeake and Interstate Pilots Association offers pilot services to U.S. vessels, engaged in the coastwise trade, and public vessels to any port or place on the York River. Arrangements for pilots may be made through ships' agents or the pilot office in Norfolk (telephone, 804-855-2733; cable, CINPILOT). Pilots will meet vessels entering from sea at Cape Henry (discussed in chapter 9), and will meet a vessel at its port if it is on the Chesapeake Bay and its tributaries or Delaware Bay and River and provide pilot services directly to the York River. The Virginia Pilots Association offers pilotage to all vessels. Pilot service above Cheatham Annex is available only during daylight. (See Pilotage, chapters 3 and 9.)

Supplies are available at Yorktown, West Point, and at other places described in this chapter. **Repairs** can be made to small vessels in Perrin River, Sarah Creek, and at other places.

Chart 12238.–York Spit extends outward along the northeast side of the York River approach channel for 7 miles from Guinea Marshes; the inner half of the spit has depths of 1 to 6 feet, and the outer half 10 to 20 feet.

York Spit Light (37°12.6′N., 76°15.3′ W.), 30 feet above the water, is shown from a pile with a black and white diamond-shaped daymark, in depths of 12 feet near the outer end of the spit; a seasonal fog signal is sounded at the light. The light is 19.8 miles above the Capes.

The York River approach channel, extending from about 7 miles southeast of York Spit Light to about 3 miles northwest of the light, has a controlling depth of about 37 feet and is well marked. There are natural depths in excess of 37 feet from the north end of the dredged section to the naval installation 5 miles above Yorktown bridge.

About 1.5 miles northwest of York Spit Light, a buoyed lane extends northeastward through the fishtraps. The lane has depths of 15 feet or more and can be used by medium-draft vessels approaching York River from northward.

The swash channel through York Spit about 5 miles northwest of York Spit Light has a controlling depth of about 7 feet; it is marked by a light and daybeacons. The channel shows up well on a bright day.

Chart 12241.–The entrance to York River is between **Tue Point** and **Guinea Marshes,** 25.9 miles above the Virginia Capes.

Tue Marshes Light (37°14.1′N., 76°23.2′W.), 41 feet above the water, is shown from a white square house on brown piles with a red and white diamond-shaped daymark, in depths of 4 feet 0.3 mile north of Tue Point; a seasonal fog signal is sounded at the light.

Perrin River, on the north side of York River 2 miles above the mouth, has depths of 6 feet or more in the approach and through a narrow marked channel to the wharf at **Perrin,** on the north side 0.3 mile above the entrance. A marina on the east side has gasoline, diesel fuel, some supplies, and a 20-ton mobile hoist; hull and engine repairs can be made. Gasoline and diesel fuel can be obtained at several of the oysterhouse wharves, on the east side of the river entrance; depths of 4 to 7 feet are alongside the wharves.

The Amoco offshore pier, on the south side of York River 3.3 miles above the mouth, has reported depths of 40 feet along the 1,240-foot outer face. The pier, connected to shore by a 0.5 mile long catwalk, is marked at its easterly end by a private light.

The intake for an electric powerplant, on the south side of the river 4.2 miles above the mouth, is marked by two lights.

Wormley Creek and **West Branch** have a common entrance on the south side of York River, 4.5 miles above the mouth; a light marks the entrance. A privately dredged channel leads through the entrance to the Coast Guard Reserve Training Center basin and pier on the north side of West Branch 0.8 mile above the entrance light. In October 1984, the channel, marked by a light, buoys, and daybeacons, had a centerline controlling depth of 5 feet to the Coast Guard basin. Local knowledge is advised. Gasoline diesel fuel, berths, water, electricity, a 37-ton mobile lift, and marine supplies can be obtained at a marina on the east side of Wormley Creek just above the entrance; hull and engine repairs can be made.

The Coast Guard T-pier (37°13.6′N., 76°28.7′W.), on the

south side of York River 5 miles above the mouth, has depths of 30 feet reported at the outer end.

A **naval explosives handling berth** is northward of the Coast Guard pier. (See **334.260,** chapter 2, for limits and regulations.)

Sarah Creek, on the north side of York River 6 miles above the mouth, has depths of 7 feet through the marked entrance channel and for about 0.8 mile up both its branches. A large yacht haven, on the west side 0.3 mile above the entrance, has supplies, gasoline, diesel fuel, and berths. Repairs can be made at a boatyard 0.3 mile up Northwest Branch; marine railway, 76 feet; largest lift, 60 tons.

A fixed highway bridge with a clearance of 6 feet and channel width of 47 feet crosses Northwest Branch about 0.8 mile above its mouth.

Yorktown, the historic Revolutionary War town, is on the southwest side of York River 6.7 miles above the mouth. High on the bluff in the southerly part is the **Yorktown Monument,** and a group of buildings is prominent on the shore back of the wharves. The main part of the town is not visible from the river. **George P. Coleman Memorial Bridge,** from Yorktown to Gloucester Point, has twin spans with clearance of 60 feet; the two spans open clockwise simultaneously. The bridgetender monitors VHF-FM channel 13; call sign KQ-7166. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.)

The public wharf at the Yorktown end of the bridge has depths of 6 feet at its face, but depths of 20 feet or more are only 5 feet off of it. The post office is at the wharf. Supplies are available nearby.

Permission to use the wharf facilities may be obtained from the Board of Trustees, P.O. Box 512, Yorktown, Va. 23690.

Gloucester Point is a village at the northeast end of Coleman Bridge. There are several piers and buildings on the low point, and the red brick building of the Virginia Institute of Marine Science is about 500 yards northeastward. The long T-head pier (37°14′46″N., 76°30′02″W.), owned by the Institute, has reported depths of 8 feet at the face. A shorter pier of the Institute is about 150 yards to the northward; depths of 6 feet are reported at the face.

The **Yorktown Naval Weapons Station** piers on the southwest side of York River, 8 miles above the mouth, have depths of about 39 feet at their outer ends. A **prohibited area** and a **restricted area** for mine service testing are off the piers. (See **334.260,** chapter 2, for limits and regulations.) A **naval anchorage** begins off the Naval Weapons Station piers and extends upriver about 4 miles. (See **110.166,** chapter 2, for limits and regulations.)

The **Naval Supply Center** piers at **Cheatham Annex Depot,** on the southwest side of York River 11.5 miles above the mouth, have reported depths of 22 feet at the southeasterly T-pier and 24 feet at the northwesterly L-pier; greater depths were reported close off the pier faces. The piers are within a **naval restricted area.** (See **334.270,** chapter 2, for limits and regulations.)

Chart 12243.–Queen Creek (37°18.1′N., 76°36.9′W.), on the southwest side of York River 13 miles above the mouth, has depths of about 5 feet with local knowledge through a marked channel across the flats at the entrance and deeper water through a narrow channel inside for 2.7 miles to **Hawtree Landing.** The channel inside is marked by daybeacons to a point about 0.6 mile below Hawtree Landing. Stakes on either side of the entrance mark the limits of the State's experimental oyster beds.

Aberdeen Creek, on the northeast side of York River 14 miles above the mouth, has a marked dredged channel leading to a turning basin and public landing 0.4 mile above the entrance. In 1982-March 1983, the controlling depth was 2 feet at midchannel to the basin, thence 3 feet in the basin. Gasoline and diesel fuel are available at a seafood company wharf just north of the public landing.

The ruins of a long T-head pier are at **Clay Bank,** on the northeast side of York River 15 miles above the mouth.

Poropotank Bay, on the northeast side of York River 22 miles above the mouth, has depths of 5 feet at the entrance; the best water favors the eastern side which is marked by bush stakes. From the entrance, depths of about 5 feet can be carried 4 miles through **Morris Bay** and **Poropotank River** to **Miller Landing.** There are several other landings along the river. The channel is usually marked by bush stakes, but is crooked and narrow in places and difficult to navigate without local knowledge.

West Point, at the junction of Mattaponi and Pamunkey Rivers 29 miles above the mouth of York River, has waterborne commerce in pulpwood, paper products, and petroleum. The town is the terminus of a Southern Railway branch line. The pulp, paper, and paperboard wharves just above the Eltham Bridge have reported depths of 16 feet alongside.

At West Point, the maximum current velocity is 0.8 knots on the flood in Mattaponi River, and 0.9 knots on the ebb in Pamunkey River. Broken-off piling extends off the south side of West Point.

A public pier is at the southeast end of West Point, at the mouth of Mattaponi River. Gasoline is available at an oil wharf with depths of 5 to 15 feet alongside 0.4 mile south of the Lord Delaware Bridge; diesel fuel can be delivered by truck. An oil pier 0.2 mile above the bridge has depths of 18 feet alongside. Supplies can be obtained in town.

Chart 12243.–Mattaponi River, which empties into York River eastward of West Point (37°31.7′N., 76°47.7′W.), is one of two tributaries that combine to form York River. Traffic on Mattaponi River consists chiefly of pulpwood. Drafts of vessels using the river above West Point usually do not exceed 10 feet.

Controlling depths in Mattaponi River are as follows: 12 feet to **Courthouse Landing,** 13 miles above the mouth; thence 9 feet for 10 miles to **Locust Grove;** and thence 2 feet to **Aylett,** 32 miles above the mouth.

The channel in Mattaponi River is unmarked and is difficult to navigate without local knowledge. The mean range of tide is 2.8 feet at West Point and 3.9 feet at Walkerton. Freshets occur at irregular intervals, being more severe in March and April, and have reached a height of 17 feet above low water at Aylett, though this is exceptional; the freshet rise is negligible at and below West Point.

The Lord Delaware Bridge over Mattaponi River at West Point has a swing span with a clearance of 12 feet; the eastern opening is used as there are no fenders on the western opening. (See **117.1 through 117.59 and 117.1015,** chapter 2, for drawbridge regulations.) Overhead power cables about 1.8 and 13 miles above the mouth have clearances of 62 feet and 90 feet, respectively.

The **Walkerton** highway bridge, 24.5 miles above the mouth of Mattaponi River, has a swing span with a clearance of 6 feet through the southerly opening which has fenders. (See **117.1 through 117.59 and 117.1015,** chapter 2, for drawbridge regulations.) Two fixed bridges cross the river at Aylett, 32 miles above the mouth; minimum clearance is 20 feet. The minimum clearance of the overhead power cables between the bridges at Walkerton and Aylett is 42 feet.

Pamunkey River, the westerly of the two tributaries that form York River, has many landings along its banks. Traffic on the river consists chiefly of pulpwood; there is a grain elevator platform at **Port Richmond,** 2 miles above the mouth. Vessels with drafts up to 12 feet navigate the river to Port Richmond.

Controlling depths in Pamunkey River are about 12 feet from the mouth to **Cumberland Landing,** 20 miles above the mouth, thence 8 feet to **White House,** 28 miles above the mouth, and 4 feet to the Newcastle Bridges 46 miles above the mouth. The mean range of tide is 2.7 feet at **Sweet Hall Landing,** 15 miles above the mouth, and 3.3 feet at **Northbury,** 35 miles above the mouth. Freshets occur at irregular intervals, being more severe in March and April.

Pamunkey River is easy to navigate as far as **Brickhouse Landing,** 16 miles above the mouth; farther up, navigation is difficult without local knowledge. Freshwater is available at some of the landings, and the river water is fresh above Cumberland Landing. Several narrow cutoffs have depths enough for small boats, but their use requires local knowledge. Above **Retreat,** 36 miles above the mouth, the river is covered with floating debris and snags.

The Eltham Bridge over Pamunkey River at West Point has a swing span with a clearance of 10 feet; the southwest opening is preferred, as there are no fenders along the northeast opening. The bridgetender monitors VHF-FM channel 13; call sign KQ-7168. Power cables crossing the river about 2 and 14.6 miles above the mouth have clearances of 60 and 90 feet, respectively. The railroad bridge at White House has a swing span with a clearance of 4 feet; the easterly opening is used. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.)

Chart 12238.–Mobjack Bay, which is entered between Guinea Marshes at the shore end of York Spit, and New Point Comfort, 4 miles east-northeastward, includes several tributaries, the most important being East, North, Ware, and Severn Rivers. The bay is obstructed by extensive shoals, but has depths of 22 feet in the entrance and 15 feet for considerable distances into the tributaries. Many of the shoals are marked by lights and buoys.

The only prominent marks in the approach to Mobjack Bay are York Spit Light on the south and the white tower of the abandoned lighthouse on New Point Comfort on the north. The approach channel extends between fishtrap buoys; numerous crab pots exist shoreward of these buoys. Good anchorage, sheltered from all but southerly and southeasterly winds, can be found in the bay. Small craft find safe anchorage in the bight westward of New Point Comfort and in the rivers and creeks. The mean range of tide is 2.3 feet at the entrance.

New Point Comfort is the south end of a low, partly wooded island which is separated from the mainland by **Deep Creek,** a crooked and unmarked natural channel. The pile remains of **Bayside Wharf,** visible at high water 1.5 miles northwest of New Point Comfort, extend about 0.4 mile channelward.

Davis Creek, 1.6 miles northwest of New Point Comfort, has a marked dredged channel leading to a public landing in the western arm about 0.8 mile above the entrance. In October 1986, the controlling depth was 7 feet in the east half of the channel from Light 1 to Light 8, thence 9 feet to the turning basin with 10 feet in the basin. Depths of 8½ to 10 feet are alongside the face of the public landing. Several wharves are on the shore in the upper part of the creek; gasoline and diesel fuel are available.

Pepper Creek, 3 miles northwest of New Point Comfort, has depths of 4 feet for about 0.7 mile above the entrance. The approach is marked by daybeacons.

East River, 5 miles northwest of New Point Comfort, has a marked narrow channel with depths of 10 feet for 3.5 miles above the entrance, and thence 4 feet for another 2 miles to the head. Shoals, sometimes marked by bush stakes, extend for some distance off many of the points above the entrance, but the midchannel is clear.

Diggs Wharf, on the east side of East River just inside the entrance, is in ruins. There are no commercial facilities at **Mobjack** opposite Diggs Wharf.

Williams Wharf, on the northeast side of East River about 2.5 miles above the entrance, has reported depths of 6 to 8 feet alongside the abandoned oysterhouse bulkhead. A boatyard on the western shore opposite Williams Wharf has a 50-foot marine railway; repairs can be made.

North River, which empties into the head of Mobjack Bay from northward, is wide, but has long shoals making off from many of the points. The channel has depths of 12 feet for 4 miles and is well marked; depths of 7 feet can be carried 2 miles farther. **Blackwater Creek** empties into North River 3 miles above the mouth. The entrance is marked by a light and depths of 7 feet can be carried for 0.5 mile to a boatyard and a marina just inside the entrance of **Greenmansion Cove;** gasoline, diesel fuel, and some supplies are available. The depth at the face of the dock is 5 feet. Hull and engine repairs can be made; marine railway, 50 feet; mobile hoist, 6 tons.

Ware River, which flows into the head of Mobjack Bay from northwestward, has depths of 15 feet to the mouth of **Wilson Creek,** on the west side 3 miles above the entrance, and 7 feet for another 2 miles. Long shoals, some of which are marked by lights and daybeacons, extend off many of the points. The only commercial landing on Ware River is the J. C. Brown Co. wharf, on the east side about 4 miles above the entrance, which has a depth of about 5 feet off the end; gasoline is available. **Schley,** 0.5 mile inland from the wharf, has a store.

Severn River, on the west side of Mobjack Bay, has depths of 18 feet to the junction with **Northwest Branch** and **Southwest Branch,** 8 feet for 1.3 miles in Southwest Branch, and 8 feet for 1.8 miles in Northwest Branch. The most prominent shoals are marked by lights or daybeacons.

A wharf at **Glass,** on the north side of Southwest Branch 1.1 miles above the fork, has depths of about 7 feet to the outer end. Mariners are advised to stay within the marked channel to avoid the 1-foot shoal extending from the point 0.4 mile eastward of the wharf. Gasoline, diesel fuel, and marine supplies are available. Hull and engine repairs can be made; marine railway, 60 feet. A marina on the west side of **Rowes Creek,** 0.5 mile southeast of the Glass Wharf, has gasoline, diesel fuel, marine supplies, and a 10-ton mobile hoist.

Browns Bay, 1 mile south of Severn River, is marked by lights at the entrance and by bush stakes inside. Gasoline and diesel fuel are available at a wharf, with a depth of 4 feet at the end, at the head of the bay. A store is at **Severn,** about 1 mile westward of the wharf.

Dyer Creek, which empties into Chesapeake Bay 2 miles north of New Point Comfort, has depths of 3 feet in the entrance and 4 to 5 feet inside. The creek is bush-staked, but local knowledge is essential. Overhead power cables across the creek have a least clearance of 17 feet.

Horn Harbor is entered through a dredged channel marked by lights 2.4 miles northward of New Point Comfort; lights and daybeacons mark the channel in the upper part of the harbor. In May 1987, the controlling depth was 3½ feet in the dredged channel, thence in 1977,

about 5 feet to a point 3.5 miles above the entrance. In April 1982, a 3-foot shoal was reported on the northeast edge of the channel at the bend opposite Horn Harbor Light 3. A cluster of submerged piling of a former fishhouse is on the east side of the channel about 1 mile above the entrance. Traffic consists chiefly of fish, shellfish, and pleasure craft.

The ruins of a fish wharf are at **New Point,** 0.7 mile above the Horn Harbor entrance. A marina, 3.5 miles above the entrance, has gasoline, diesel fuel, and some supplies. An 80-foot marine railway can haul out boats for repairs.

Winter Harbor is entered through a dredged channel marked by lights and daybeacons 4.3 miles north-northeast of New Point Comfort. The channel leads to a turning basin and public landing 1.5 miles above the entrance. In August 1986, the controlling depth was less than 1 foot in the south half of the entrance channel to Daybeacon 6, then a controlling depth of 3 feet to the turning basin with 2 to 3 feet available in the basin, except for shoaling to bare along the north edge. Commerce in the harbor consists chiefly of fish and shellfish.

Wolf Trap, the area of broken ground 6 miles northward of New Point Comfort, has numerous shoal spots 5 to 10 feet deep which extend as much as 3 miles from the western shore of Chesapeake Bay. All the shoal area lies in the fishtrap limits. **Wolf Trap Light** (37°23.4′N., 76°11.4′ W.), 52 feet above the water, is shown from an octagonal red-brick dwelling with a square tower on a brown cylinder, in depths of 16 feet near the outer end of the shoal area. The light is 5 miles due west of a point in the main channel 28.8 miles above the Capes.

Chart 12225.–The **danger zone** of a naval firing range begins about 4 miles north-northeastward of Wolf Trap Light and extends northward to Tangier Sound Light, just south of **Tangier Island.** (See **334.220**, chapter 2, for limits and regulations.) The danger zone also contains a designated hurricane anchorage for shallow and deep-draft naval vessels. During hurricane warnings, naval ships may be anchored in the fairway; caution is advised.

The ruins of a former degaussing range control tower, 6.2 miles eastward of Wolf Trap Light, are covered 3½ feet. A lighted bell buoy, 150 yards to westward, marks the obstruction.

Chart 12235.–Piankatank River is 11 miles northward of Wolf Trap Light. The entrance is between **Cherry Point** (37°31.0′N., 76°17.8′W.), at the north end of **Gwynn Island,** and **Stingray Point,** 2.5 miles to the northward. The entrance point is 45.3 miles above the Virginia Capes. **Stingray Point Light** (37°33.7′N., 76°16.2′ W.), 34 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on piles in depths of 6 feet 1.3 miles east of the point; a seasonal fog signal is sounded at the light.

Traffic on Piankatank River consists of fish, shellfish, and shells. Drafts of vessels using the river are mostly 6 feet, but drafts up to 11 feet are on record. The river has depths of about 18 feet in the approach from northeastward through a buoyed lane in the fishtraps, 16 feet or more to the fixed bridge 9 miles above the mouth, and 7 feet to Freeport, 13.5 miles above the mouth. Lights and buoys mark the lower 6 miles of the river channel.

The mean range of tide is 1.2 feet in the lower part of Piankatank River. During severe winters, the river is sometimes closed by ice for short periods. Hull repairs can be made to medium-size vessels in Fishing Bay; gasoline and diesel fuel are available.

Jackson Creek, on the north side of Piankatank River 1 mile above the mouth, has a dredged entrance channel marked by a light and daybeacons. The controlling depth in 1977 was 8 feet in the entrance, with natural depths of 8 to 10 feet inside. Stakes usually define the channel edges. **Deltaville** is at the head of the north arm.

There is a marina along Jackson Creek where fuel, supplies, and berths can be obtained. The largest lift can handle boats to 35 tons feet for hull and engine repairs.

Hills Bay, on the south side of Piankatank River 2 miles above the mouth, has general depths of 14 to 20 feet, and is the approach to Queens Creek and Milford Haven.

Queens Creek, at the head of Hills Bay, is entered by a dredged channel that leads across the bar at the entrance and thence to a turning basin about 0.6 mile above the entrance. In October 1986, the controlling depth was 4½ feet in the southeast half of the entrance channel to Light 5, thence 4 feet to the basin, and 5½ feet in the basin. The channel across the bar and to the turning basin is marked by lights and daybeacons. A few broken piles that remain of the wooden jetty on the north side of the entrance are marked at the outer end by a daybeacon.

Milford Haven, the strait between Gwynn Island and the mainland to the southwestward, is entered from the head of Hills Bay. Traffic on the waterway consists chiefly of fish and shellfish carried in vessels drawing up to 7 feet. A marked channel with a controlling depth of 10 feet in September 1972 leads from Hills Bay to natural depths of 15 to 8 feet in Milford Haven.

The jetty on **Narrows Point,** at the north side of the Hills Bay entrance to Milford Haven, is marked by a light. The highway bridge from the mainland to Gwynn Island has a swing span with a clearance of 12 feet in the north opening. (See **117.1 through 117.49**, chapter 2, for drawbridge regulations.)

A marina on Gwynn Island just west of the bridge has gasoline, diesel fuel, supplies, and berths; Hull and Engine repairs can be made; lift, 40 tons, railway, 60-foot long. A public landing pier is on Gwynn Island just east of the bridge. **Milford Haven Coast Guard Station** is 0.2 mile east of the south end of the bridge.

Callis Wharf at **Grimstead,** on the Gwynn Island side of Milford Haven 0.7 mile from the jetty, has depths of 9 feet at the face. Gasoline, diesel fuel, and some other supplies are available. A marine railway on the southeast side of the entrance to **Edwards Creek,** 0.5 mile eastward of Callis Wharf, can handle boats up to 35 feet for hull repairs.

A wharf at **Cricket Hill,** on the west side of **Lanes Creek,** opposite Edwards Creek, has gasoline, diesel fuel, and ice; depths of 8 feet are reported at the face.

Milford Haven can also be entered from Chesapeake Bay at the south end of Gwynn Island. This passage, known as **Hole in the Wall,** has a reported controlling depth of about 4 feet and is used by small local boats, but is exposed to heavy seas. The passage is marked by lights, daybeacons, and a buoy.

A fish haven, marked by a private buoy, is about 1.3 miles northeast of the entrance to Hole in the Wall.

Stutts Creek enters the southern part of Milford Haven from the southwestward. There are depths of 6 feet or more from Milford Haven to a yacht club on the north side of Stutts Creek, 1.8 miles above the mouth; gasoline and some supplies can be obtained.

Fishing Bay, on the north side of Piankatank River 4 miles above the mouth, has depths of 12 to 30 feet and provides good protection from north and east winds. On the east side of the bay is narrow 1-mile-long **Stove Point Neck.** A private 700-foot-long pier with a depth of 8 feet at the outer end extends westward from the middle of the neck.

Repairs can be made at boatyards at the north end of the bay; largest marine railway, 150 feet; lift, 20 tons. Gasoline, diesel fuel, and supplies are available.

Cobbs Creek is on the south side of Piankatank River, 7 miles above the mouth. A channel marked with daybeacons at the entrance and with reported depths of about 6 feet leads to a marina 0.2 mile inside on the west side of the creek. Gasoline, diesel fuel, supplies, and berths are available; repairs can be made; 45-foot marine railway. An overhead power cable with a clearance of 50 feet crosses the creek about 0.4 mile above the mouth.

Dixie, a village on the south side of Piankatank River, is 9 miles above the mouth; gasoline is available in the town. The former oil wharf has depths of about 10 feet off its outer end. The fixed highway bridge just west of the village has a clearance of 43 feet; an overhead power cable close westward of the bridge has a clearance of 68 feet.

About 5.7 miles above the fixed highway bridge, an overhead power cable with a clearance of 64 feet crosses the river.

Charts 12235, 12237.–Rappahannock River flows into the west side of Chesapeake Bay 45.7 miles by channel from the Virginia Capes. Fredericksburg, 93 miles above the mouth, is the head of practical navigation.

Traffic on the river consists chiefly of pulpwood, shellfish and shells, chemicals, and some sand and gravel. Drafts of vessels using the river seldom exceed 11 feet and are mostly 6 feet or less.

Mileages on Rappahannock River, such as Mile 15N and Mile 32W, are the nautical miles above the midchannel point on a line drawn from Stingray Point to Windmill Point. The letters N, S, E, or W following the numbers denote by compass points the side of the river where each feature is located.

The river has natural depths of 15 feet or more to the bridge at Tappahannock, 37.4 miles above the mouth. Above this point, a Federal project provides for dredging of the bars to provide a channel 12 feet deep to Fredericksburg. In 1955-December 1977, the controlling depths were 8½ feet from the bridge at Tappahannock to the bridge at Port Royal, Mile 68.3, thence 9 feet to the Fredericksburg Bar, Mile 93.0, thence 6½ feet to Steamboat Wharf and 4 feet to the Standard Oil Co. Wharf, Miles 93.1 and 93.2, respectively, at Fredericksburg. A submerged obstruction is reported in the river at about Mile 87.8 in 38°14.9'N., 77°22.3'W.

In general, vessels can anchor anywhere near the channel of Rappahannock River where the bottom is soft and the depth suitable. Deep-draft vessels will find good anchorage 3 to 5 miles from the mouth. Carter and Urbanna Creeks are used extensively as harbors by small craft.

The channel from the mouth of Rappahannock River to Tappahannock is comparatively straight, but gradually decreases in width and leads between shoals that make out from both banks. The principal dangers are marked. Strangers can take a draft of 10 feet to Tappahannock by day with the aid of the chart, but navigation of the narrow, crooked channel farther up requires local knowledge. There are rocks in places on both sides of the channel for 4 miles below Fredericksburg, and the shores should be given a good berth. Strangers can safely carry a draft of 5 feet to Fredericksburg with the aid of the chart.

The mean range of **tide** is 1.2 feet at the mouth of Rappahannock River, 1.7 feet at Tappahannock, and 2.8 feet at Fredericksburg. The river water is fresh above Port Royal.

The **currents** follow the general direction of the channel. The velocities throughout the river are usually weak, averaging less than 1 knot at the entrance to 1.4 knots at Tappahannock. Times of slack water and strength of current become later going upriver. These normal conditions are subject to change by winds and changes in drainage flow.

During severe winters, **ice** closes the river nearly to Tappahannock, but in ordinary winters the channels are usually kept open by the river traffic. Ice sufficient to interfere with navigation of small craft will usually be encountered in January and February, particularly above Port Royal.

Freshets occur during the spring and fall, but are of short duration and ordinarily are not dangerous to shipping. The highest level on record was 33 feet above low water at Fredericksburg, but the usual height due to freshets is not more than 9 to 12 feet and only occasionally rises above the wharves. The freshet effect on the water level decreases rapidly below Fredericksburg and is ordinarily negligible 11 miles downriver.

The principal places along Rappahannock River for supplies and small-vessel **repairs** are Broad Creek, Carter Creek, and Urbanna Creek.

Charts 12235, 12237.– The entrance to Rappahannock River is between Stingray Point and **Windmill Point,** 45.7 miles above the Capes. This is the **Mile 0.0** for distances on the Rappahannock. The shores on both sides of the entrance are wooded; the two lights, off Stingray and Windmill Points, are the most prominent landmarks.

Rappahannock Spit extends southeastward from Windmill Point for about 4.5 miles, and has depths of 4 to 18 feet. **Windmill Point Light** (37°35.8' N., 76°14.2' W.), 36 feet above the water, is shown from a skeleton tower with a black and white diamond-shaped daymark on piles, in depths of 12 feet on the spit 2.3 miles from the point; a seasonal fog signal is sounded at the light.

Depths of 10 feet can be carried across Rappahannock Spit anywhere outside Windmill Point Light. About 0.4 mile outside the light, a buoyed lane that extends southwestward through the fishtraps is a short cut for lightdraft vessels approaching the river from northward.

A 6-foot marked channel leads to a marina basin on the south side of **Fleets Island** west of Windmill Point. Gasoline, diesel fuel, and berths are available. Repairs can be made to small craft.

Broad Creek, Mile 0.7S, is used by oystermen, fishing boats, and yachts. A dredged entrance channel, marked by lights and daybeacons, leads from Rappahannock River to natural depths of 7 to 5 feet inside the creek. In July 1987, the entrance channel had a controlling depth of 7 feet. There are several boatyards and marinas and a machine shop on the creek; gasoline, diesel fuel, water, ice, a sewage pump-out station, and marine supplies are available. Hull and engine repairs can be made. Maximum haul-out capacities are: marine railway, 100 feet; lift, 20 tons.

At Mile 5.0S, a dredged channel, marked by a light and a daybeacon, leads to a turning basin and wharf 0.5 mile eastward of **Mill Creek** entrance. In 1974, the controlling depth to and in the basin was 9 feet.

Locklies Creek, Mile 6.0S, has depths of about 5 feet through a marked entrance with depths decreasing to about 2 feet inside. An overhead power cable near the head has a clearance of 34 feet. There are marinas on the north and south sides near the entrance. The largest marine railway on the south side of the creek can handle craft up to 45 feet for repairs. Some marine supplies, gasoline, a sewage pump-out station, and berths are available.

A dredged channel westward of Parrott Island forms an

inside passage between Mill Creek and Locklies Creek. In 1974, the channel had a reported depth of 6 feet. In August 1979, shoaling to 4 feet was reported at the southeast end of the channel.

An inactive fish factory and wharf with depths of 18 feet at the face are on **Cherry Point,** Mile 6.3N.

A fixed highway bridge crosses the river at Mile 7.0; the channel span has a clearance of 110 feet. An overhead power cable at the bridge has a clearance of 122 feet.

Carter Creek, Mile 8.3N, is the approach to the villages of **Weems** on the west side and **Irvington** on the east side. Traffic on the creek consists chiefly of petroleum products, shellfish, and shells. Drafts using the creek seldom exceed 11 feet and are mostly 6 feet or less.

Controlling depths of the channels in Carter Creek are about 15 feet in the entrance, 12 feet in Eastern Branch to the wharves at Irvington, and 9 feet in **Carter Cove,** the western branch. The entrance is marked by lights and daybeacons. The mean range of tide is 1.4 feet.

There are several oysterhouses and yacht facilities in Carter Creek. Most vessels go alongside the wharves with depths of about 8 feet, but the creek also is used as an anchorage. A boatyard on the north side of Carter Cove at the entrance has a 200-foot marine railway that can handle craft up to 1,200 tons for repairs. (See the small-craft facilities tabulation on chart 12237 for services and supplies available.)

Corrotoman River, Mile 10.0N, has depths of 14 feet or more for 4 miles to the junction of Eastern and Western Branches. The river channel is obstructed by shoal spits and middle grounds, but the principal shoals as far as the fork, and for 0.5 mile above in Western Branch, are marked. The mean range of tide is 1.3 feet in the river.

Whitehouse Creek, on the west side of Corrotoman River 0.8 mile above the mouth, has depths of 7 feet to the landing at **Bertrand,** on the north side 0.5 mile from the entrance. **Town Creek,** on the west side of Corrotoman River 2 miles above the mouth, has depths of 2 to 4 feet. Gasoline is available near the head. **Taylor Creek,** on the east side of Corrotoman River 2.5 miles above the mouth, has depths of 2 to 5 feet in the entrance and 4 to 8 feet inside the creek.

Eastern Branch of Corrotoman River has depths of 13 feet for 1.4 miles, thence 8 feet for 1.5 miles. **Western Branch** has depths of 12 feet or more for 2.5 miles, thence 5 feet for 2 miles.

Cable ferry.–A cable ferry crosses Western Branch from **Ottoman Wharf,** on the southwest side about 1.3 miles above the fork, to **Merry Point,** on the opposite side. The ferry carries passengers and vehicles. The ferry operates between the hours of 0700 and 1900, Monday through Saturday, and 0700 to dark during the winter months. When the ferry is underway, the unmarked cable is suspended about 3 feet above the water's surface, and is dropped to the bottom when not underway. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

Whiting Creek, Mile 10.5S, is entered from Rappahannock River by an unmarked dredged channel. In 1975, the channel had a controlling depth of less than 1 foot. An unmarked sunken work boat is on the easterly edge of the channel about 0.35 mile above the entrance.

Chart 12237.–Urbanna Creek, Mile 13.8W, is used by many pleasure craft. The town of **Urbanna** is on the west bank, near the entrance.

A dredged channel leads from Rappahannock River to a turning basin and wharves just below the bridge. In July 1987, the controlling depths were 7 feet in the channel and 8 to 10 feet in the basin. Above this point, depths are 6 feet or more for about 0.7 mile, and small craft can go another mile upstream. In May 1981, shoaling to 4 feet was reported about 0.4 mile above the fixed highway bridge in about 37°37′34″N., 76°34′34″W. The marked entrance is protected by a riprap jetty on the north. The mean range of tide is 1.4 feet.

The wharves at Urbanna have depths of 7 to 14 feet alongside. Marine supplies, fuel, pump-out station, and berths are available. Repairs can be made; largest mobile lift, 40 tons.

The fixed highway bridge over Urbanna Creek 0.7 mile above the entrance has a 40-foot channel span with a clearance of 21 feet. A "no wake" **speed limit** is in effect in Urbanna Creek.

Robinson Creek, Mile 14.1W, has depths of 5 feet through the entrance to the head. **Urbanna Wharf,** on the south side of the entrance, is about 900 feet long with depths of 6 feet at the outer end. A yacht yard is at the wharf.

Lagrange Creek, Mile 14.8W, has depths of 7 feet in the marked entrance and 4 feet for 1 mile to a boatyard on the southwest side. A 40-foot marine railway and a machine shop are available. Gasoline and some supplies are obtainable. The wharf has depths of 4 feet at the outer end.

Greenvale Creek, Mile 16.9E, is used mostly by local fishermen. A dredged channel, marked by a light and daybeacons, leads from Rappahannock River to a landing about 0.3 mile above the mouth of the creek. In July 1986, the midchannel controlling depths were 2 feet from the entrance to Daybeacon 6, then 5 feet to the landing 0.3 mile above the mouth of the creek. The oysterhouse landings on the west side have reported depths of 6 feet alongside; gasoline and some supplies are available. Hull and engine repairs can be made; marine railway, 40 feet.

Parrotts Creek, Mile 20.0W, has a dredged channel marked by lights and daybeacons from the entrance to the public landing at **Water View,** 0.5 mile above the mouth. The controlling depth was 5 feet in 1974. An overhead power cable across the creek just above the mouth has a clearance of 50 feet. Oyster wharves near the entrance have depths of 5 to 8 feet at their faces; gasoline is available. Repairs can be made; marine railway, 42 feet.

Deep Creek, Mile 21.0E, has depths of 2 feet across the flats at the entrance and 3 to 5 feet in the several branches. The creek usually is bush-staked. The overhead power cables have a minimum clearance of 30 feet. Gasoline is available at an oysterhouse at **Boer** on the south side of the creek.

Mulberry Creek, Mile 22.4N, in 1974, had reported depths of 4 feet in the dredged cut at the entrance. Above the dredged cut there are depths of about 4 feet for 1 mile upstream. A light marks the west side of the entrance, and a shell islet awash at high water is at the inner end of the channel cut. A daybeacon marks a submerged shell pile 0.3 mile southwestward of the light. The daybeacon also marks the entrance to a privately dredged channel passing immediately to the west of the shell pile. This channel had a depth of 3 feet in 1974. Gasoline and some supplies are obtainable at **Morattico,** on the northwest side of the entrance.

Lancaster Creek, Mile 23.5N, has depths of 5 feet in the marked entrance, and thence from 4 to 2 feet for 4 miles to **Woodhouse Landing.** About 2 miles above the entrance, the creek is crossed by an overhead power cable with a clearance of 27 feet. A marina on the west side of the entrance has about 3 feet in its basin; some supplies and gasoline are available. Minor repairs can be made.

Morattico Creek enters Rappahannock River just westward of Lancaster Creek. Oysterhouses are on both sides of

the entrance. In 1980, the controlling depth was reported to be 6 feet through the entrance and alongside the wharves.

At **Butylo,** Mile 24.2W, a jetty extends 0.4 mile into the river; depths of 4 feet are reported alongside. An oyster-house is on the jetty.

A small-boat harbor is at **Wildwood Beach,** Mile 28.3W. The entrance to the harbor is protected on the north side by a 300-foot-long jetty, and on the south side by a point of land extending to seaward about the same distance. A light is off the jetty. In 1980, the reported controlling depth was 2 feet in the entrance and basin. Gasoline, diesel fuel, water, ice, some marine supplies, and a 45-foot marine railway and a 6-ton lift are available; minor hull and engine repairs can be made.

Rappahannock River Light 19 (37°49.5′ N., 76°44.0′ W.), 23 feet above the water, is shown from a cylindrical base, with a square green daymark, in depths of 6 feet at Mile 28.5. **Bowlers Rock,** covered 7 feet and buoyed, is on the east side of the channel about 500 yards eastward of the light. A submerged wreck is on the southwest edge of the channel 100 yards north-northeastward of the light; and foul ground extends upriver along the southwest edge of the channel for 1.3 miles from the light.

Totuskey Creek, Mile 30.8N, is entered by a marked dredged channel which leads to a turning basin below the Totuskey Bridge, 4 miles above the mouth. In January-February 1975, the channel had a controlling depth of 5 feet from the entrance to 300 yards southward of the Totuskey Bridge, thence 3 feet to the bridge. The channel is narrow in places and difficult to follow without local knowledge. In December 1979, it was reported that the channel was partially blocked in the vicinity of Daybeacon 26, about 2.6 miles above the entrance. A timber-and-bush dike on the northeast side, 2.5 miles above the entrance, is barely visible. An overhead power cable about 3.2 miles above the entrance has a clearance of 75 feet. **Totuskey Bridge** is a fixed concrete span with a width of 24 feet and a clearance of 10 feet. A wharf on the southeast bank, just below the bridge, has depths of 10 feet at the face and is used by grain barges. Barges load pulpwood at a landing on the opposite shore, about 0.2 mile below the bridge.

An overhead power cable over the Rappahannock River at Mile 32.1 has a clearance of 80 feet over the main channel and 50 feet elsewhere.

Piscataway Creek, Mile 35.0W, has depths of 4 feet in the entrance with greater depths for 5 miles upstream. A highway bridge, 4 miles above the entrance, has a fixed span with a width of 30 feet and a clearance of 8 feet. Overhead power cables between the entrance and the bridge have a minimum clearance of 16 feet.

Hoskins Creek is at Mile 36.8W. A marked dredged channel extends from the entrance to a turning basin about 0.4 mile above the mouth, thence to the highway bridge about 0.6 mile above the mouth. In December 1984, the midchannel controlling depth was 4 feet in the entrance channel, thence 7 feet at midchannel to the basin, thence 7 feet in the middle part of the basin (much lesser depths along the sides), thence 7 feet at midchannel to just below the highway bridge. A grain depot is near the bridge, and there is a public wharf about 0.3 mile below the bridge. The fixed highway bridge has a 34-foot channel span with a clearance of 8 feet; the nearby overhead power cable has a clearance of 43 feet. A small marina is near the first bend. A "no wake" **speed limit** is enforced.

Tappahannock is at Mile 37.4W. The highway bridge over the river at Tappahannock has a fixed span with a clearance of 50 feet. A wharf just below the bridge is in ruins.

A privately marked channel with a depth of about 4 feet leads to a small-boat basin at Tappahannock, 0.2 mile above the bridge. Some supplies and gasoline are available; repairs can be made.

Mount Landing Creek, Mile 38.4W, has depths of 3 feet across the flats at the entrance and deeper water inside for 3.5 miles. Twin fixed highway bridges cross the creek near its entrance; minimum width is 34 feet and clearance is 9 feet. The overhead power cable just north of the bridges has a clearance of 18 feet. The creek is used by fishermen.

Cat Point Creek, Mile 39.5E, has depths of about 4 feet across the bar at the entrance. In 1974, shoaling to 1 foot was reported in the section of the creek beginning at a point about 1.5 miles above the mouth. Depths of about 3 feet can be carried to **Menokin Landing,** about 7 miles above the mouth, by using the cutoff in 37°59′16″N., 76°50′19″W., about 1.7 miles above the mouth; local knowledge is advised. A highway bridge over the entrance has a retractile span with a width of 31 feet and a clearance of 7 feet. The bridge is maintained in the closed position. (See **117.1 through 117.59 and 117.1001,** chapter 2, for drawbridge regulations.) In 1983, the bridge was being replaced by a fixed bridge with a design width of 41 feet and a design clearance of 7 feet. An overhead power cable 200 yards above the bridge has a clearance of 21 feet. The highway bridge 6 miles above the entrance has a 31-foot fixed span with a clearance of 4 feet.

Occupacia Creek, Mile 44.2W, has depths of 3 feet across the bar at the entrance and 4 feet for 6 miles up the middle branch; an overhead cable 2.5 miles above the entrance has a clearance of 35 feet, and the overhead cable 6 miles above the entrance has a clearance of about 30 feet. **Bridge Creek,** the eastern branch, has depths of 2 feet to a fixed bridge 1 mile above the entrance.

Layton is at Mile 50.5W. In 1980, the lower pier was in poor condition and the upper pier was in ruins. Pulpwood is shipped by barge from **Leedstown,** Mile 52.4N.

Port Royal is at Mile 68.5S. The highway bridge from Port Royal to **Port Conway** has a fixed span with a clearance of 50 feet.

Newton Rock, Mile 91.2S, is 50 feet from shore and almost awash at high tide; the best water is 100 feet off the rock, which is marked by a buoy.

In January 1983, a fixed highway bridge with a design clearance of 37 feet was under construction at Mile 92.9N.

Fredericksburg, Mile 93.5W, the historic colonial city, has little trade by water, but can accommodate motor vessels and barges drawing up to 10 feet. Practical navigation terminates at the Old City Dock at the southern end of the city, but small boats can go about 1 mile farther upriver. Anchorage space is limited. The fixed railroad bridge just above the wharf has a clearance of 37 feet. The fixed highway bridge, 700 yards farther up, has a clearance of 50 feet.

Chart 12235.–Fleets Bay, just northward of Rappahannock River entrance, is the approach to Little Bay and Antipoison, Tabbs, Dymer, and Indian Creeks.

A sunken wreck is off the north side of Rappahannock Spit southeast of the entrance to Fleets Bay in about 37°38′18″N., 76°16′06″W.

Depths of 8 feet can be taken through **Little Bay,** on the south side of Fleets Bay, westward in a narrow channel into **Antipoison Creek** and upstream for over 1 mile. The bay and creek are used by boats with drafts up to 6 feet. Two herring processing plants on the south side of Antipoison Creek 0.6 mile above the entrance have wharves with depths of 6 feet reported at the faces; another plant directly across the creek has a wharf with depths of 6 feet at the face.

Tabbs Creek, on the west side of Fleets Bay 1.5 miles northward of Antipoison Creek, has depths of 2 feet with local knowledge over the bar at the entrance, thence 7 or more feet for about 1 mile.

Dymer Creek, on the west side of Fleets Bay 2 miles northward of Antipoison Creek, has depths of 13 feet for a mile and 8 feet for another mile. The approach through Fleets Bay is well marked. An inactive fish factory is on the south side of the creek 1 mile above the entrance; the wharf is in ruins. The boatyard in **Poplar Neck Creek,** just below the fish factory, makes hull and minor engine repairs; marine railway, 65 feet.

Indian Creek, at the northwest corner of Fleets Bay 3 miles northward of Antipoison Creek, has depths of 16 feet in the approach, thence 11 feet for 2 miles above the entrance, and then shoals to 6 feet 0.8 mile farther up. Traffic on the creek consists chiefly of pulpwood, shellfish, shells, and grain. Drafts of vessels using the creek seldom exceed 13 feet and are mostly 6 feet or less. The approach through Fleets Bay and the channel in the creek are well marked.

A country club pier is about 1 mile above the mouth of Indian Creek, on the northeast side in a cove. Gasoline, diesel fuel, and some supplies are available. The pier has depths of about 6 feet at the face. **Kilmarnock Wharf,** on the west side 2 miles above the entrance, is at the foot of a paved road that leads 1.5 miles inland to the town of **Kilmarnock.** A marina at the wharf has berths, gasoline, diesel fuel, and supplies. Some hull and engine repairs can be made; marine railway, 40 feet.

Depths of 12 feet are at the dock and boat-basin landing; fuel, supplies, and berths are available. A grain wharf with 10 feet alongside is above the basin. General boat repairs can be made at the landing; marine railway, 45 feet. Depths of 6 feet can be carried for 0.5 mile up the western branch above Kilmarnock Wharf to a marine railway that can handle boats up to 40 feet for repairs.

Dividing Creek is 8.7 miles north-northwestward of Windmill Point Light. The creek has depths of 14 feet in the approach, thence 13 feet for 1.4 miles above the entrance, and then shoals gradually to depths of 8 feet 1.5 miles farther up. The creek is used by boats with drafts of 5 feet or less. The approach between the shoals off the entrance is well marked by lights and daybeacons. In June 1979, a submerged obstruction was reported in the approach about 67 yards northeast of Light 3, in about 37°42′45.5″N., 76°16′58.5″W.

Chart 12225.–In addition to the danger zone of a naval firing range that extends from north of Wolf Trap Light to south of Tangier Sound Light, previously described, several danger areas are in Chesapeake Bay between Windmill Point Light and Smith Point Light.

San Marcos Wreck, 10.5 miles northeast of Windmill Point Light, is covered by about 20 feet of water, but the depth over it is subject to change, due to the shifting steel.

The **danger zone** of a naval missile target area is centered about 3.5 miles west-southwest of **Tangier Island.** (See **334.210**, chapter 2, for limits and regulations.) Sunken ships and other obstructions are within the area.

Chart 12235.–Great Wicomico River, on the west side of Chesapeake Bay 13 miles northward of Windmill Point Light, is entered between **Dameron Marsh** and **Bull Neck,** 1.7 miles to the northward. The principal marks for the entrance are Great Wicomico River Light and the buildings at Fleeton, on Bull Neck.

Great Wicomico River Light (37°48.2′N., 76°16.1′W.), 42 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark, in depths of 9 feet 0.6 mile southeast of Bull Neck; a seasonal fog signal is sounded at the light. The light is 4.5 miles due west of a point on the main channel 56 miles above the Capes.

Great Wicomico River has depths of 17 feet or more for 5.5 miles above the entrance, and thence 9 feet or more for 3 miles. The river is navigable for small craft for another 2 miles. Vessels seeking shelter usually anchor in depths of 15 to 20 feet off and in the entrance to Cockrell Creek. Fishtraps usually will be found on the shoals at the entrance; the approach can be made on a due west course between the buoys marking the trap areas.

The channel in Great Wicomico River is marked by lights for 4 miles from the entrance. The mean range of tide is 1.1 feet at the entrance. **Ice** does not close the river to navigation except in severe winters, and then only for brief periods; Cockrell Creek is considered a secure harbor from ice.

Cockrell Creek, on the northeast side of Great Wicomico River 1 mile above the mouth, is entered between **Fleeton (Fleet) Point** on the south and Cockrell Point on the north; a light marks the entrance. There are depths of 15 feet for 1.5 miles above the entrance, thence gradual shoaling to 6 feet 1 mile farther up. Traffic consists chiefly of fish, shellfish, construction material, and petroleum products. Several fish factories operate along its shores. Drafts of vessels are mostly 12 feet and under, but drafts up to 14 feet use the creek. There are depths of 8 to 15 feet at the faces of the wharves.

A menhaden fleet is based on each side of Cockrell Creek, about 1 mile above Fleeton Point.

Fleeton is on the southeast side of the entrance to Cockrell Creek. The pier of a marine service station has 14 feet at its face; gasoline, diesel fuel, and some marine supplies are available.

Reedville is on the east side of Cockrell Creek 1.5 miles above the entrance. A petroleum pier and a barge wharf with depths of about 8 feet alongside are on the east side of the peninsula at Reedville. Gasoline, diesel fuel, and some marine supplies are available.

Reedville is a **customs port of entry.**

The boatyards along Cockrell Creek can handle vessels up to 70 feet for hull and engine repairs.

Mill Creek, on the southwest side of the river 1.5 miles above the entrance, has depths of 12 feet or more through a crooked channel across the flats and for 1 mile above the entrance, thence 8 to 10 feet for another mile. An abandoned grain wharf is 1.5 miles above the mouth.

Towles Creek is entered through a channel privately marked by daybeacons about 1.7 miles west of Great Wicomico River Light. In July 1980, the reported controlling depth was 5 feet through the entrance and in the creek. A marina on the south shore has gasoline, diesel fuel, and limited supplies.

Cranes Creek is on the west side of Great Wicomico River 1.5 miles above the mouth. The entrance channel, marked by daybeacons, had a controlling depth of 5½ feet in June 1987; greater depths are inside. Several small privately owned wharves along the banks of the creek are used by boats drawing up to 3 feet. Overhead power and telephone cables with a least reported clearance of 25 feet cross the creek near its head.

Mila, on the west side of Great Wicomico River 3.5 miles above the mouth, has a landing with a depth of 5 feet at the outer end.

The highway bridge over Great Wicomico River 6 miles above the mouth has a swing span with a clearance of 9 feet

in the north opening. (See **117.1 through 117.59 and 117.1011,** chapter 2, for drawbridge regulations.) The overhead power cable 50 yards above the bridge has a clearance of 40 feet. A marina on the east side of **Glebe Point** at the north end of the bridge can provide gasoline, diesel fuel, and supplies. Hull and engine repairs can be made; a marine railway can handle boats up to 65 feet. Gasoline is also obtainable at a wharf on Ferry Point, 0.7 mile east of the bridge.

12. CHESAPEAKE BAY, POTOMAC RIVER

This chapter describes the Potomac River and the numerous tributaries that empty into it; included are Coan, St. Marys, Yeocomico, Wicomico, and Anacostia Rivers. Also described are the ports of Washington, D.C., and Alexandria, and several smaller ports and landings on these waterways.

COLREGS Demarcation Lines.–The lines established for Chesapeake Bay are described in **80.510**, chapter 2.

Charts 12233, 12286, 12288, 12289, 12285.–Potomac River flows into the west side of Chesapeake Bay 68.4 miles above the Virginia Capes. The west bank of the river, generally, is the boundary between Virginia on the west and Maryland on the east, and at the head of tidewater on the east bank is the city of Washington, D. C., the Nation's Capital.

Hains Point at the junction of Anacostia River and the Washington and Georgetown Channels is 94.6 miles above the mouth of the Potomac. The head of tidewater navigation is at Chain Bridge, Washington, 101 miles above the mouth. The widest point of the river, 6.4 miles, is 11 miles above its mouth (see chart 12233).

Mileages on Potomac River in this chapter, such as Mile 13E, Mile 41W, and Mile 51N, are the nautical miles above the midchannel entrance point which is 4.8 miles northwest of Smith Point on a line between Smith Point and Point Lookout; that point is 68.4 miles above the Capes. The letters N, S, E, or W following the mileage numbers denote by compass points the side of the river where each feature is located.

Traffic on the river consists chiefly of petroleum products; sand, gravel, and crushed rock; and some newsprint and fertilizers. Drafts of vessels navigating the river usually do not exceed 20 feet.

Channels.–The Federal project depth is 24 feet for Potomac River from the mouth to Hains Point. Channel depths of 38 feet or more are available to Ragged Point, 20 miles above the mouth; thence the controlling depth through the dredged cuts is about 18 feet to Hains Point.

Anchorages.–Vessels bound up or down the river anchor anywhere near the channel where the bottom is soft; vessels sometimes anchor in Cornfield Harbor or St. Marys River. (See chart 12233.) Above Alexandria, vessels usually go to the wharves; there is little or no anchorage for anything but small craft. Near the mouth of the river, small craft can find secure anchorage in most of the tributaries; Smith Creek (see chart 12233) is said to have best protection from all winds.

Fishtrap areas extend upriver from the mouth to St. Clements Island. Limits of the areas are shown on charts 12233 and 12286. Mariners are warned that numerous uncharted duck blinds and fishing structures, some submerged, may exist in the fishtrap areas; such structures are not charted unless known to be permanent. (See **33 CFR 206.50** (not in this Coast Pilot) for regulations governing the fishtrap areas in the Potomac River.)

Numerous markers, established and maintained by the Potomac River Fisheries Commission, mark the Maryland and Virginia jurisdictional fishing boundaries on both sides of the Potomac River from Chesapeake Bay to Mattawoman Creek at Mile 71.5E in Maryland, and Occoquan Bay at Mile 73.8W in Virginia, and at the entrances to many of the bays and rivers.

The markers are pile structures with white square daymarks with orange borders and identifying black letters "PRM", "PRV", and numbers.

Danger zones and restricted area.–The Potomac River and its tributaries are used extensively by the military establishments for testing operations and gunnery practice. (Limits and regulations for these areas are given in **334.230, 334.240, and 334.250,** chapter 2.)

Tides.–The mean range of tide is about 1.3 feet at the mouth of the river, 1.8 feet in the vicinity of St. Clements Island, 1.1 feet at Maryland Point, 1.8 feet at Indian Head, and 2.9 feet at Washington. Above Washington, the river is tidal as far as Chain Bridge. The tides are influenced by the force and direction of the wind and by freshet conditions, and may at times vary considerably. Daily predictions for Washington, D.C. are given in the Tide Tables.

Currents.– The current in Chesapeake Bay off the mouth of Potomac River can be hazardous to smaller vessels and pleasure boats at ebb tide, and when wind and current are opposed, and with northwest winds. These conditions are more pronounced off Smith Point. The currents in the Potomac River follow the general direction of the channel. The velocities vary throughout the river and are influenced by wind and freshets. There may be little or no flood current during freshets.

The current velocity is weak in the lower part of the river between the entrance and Piney Point, averaging less than 1.0 knot. (See Tidal Current Tables for predictions.)

Ice.–During severe winters the tributaries of the Potomac are closed by ice and the river is frozen over to Cedar Point; the upper part is then closed to navigation. During ordinary winters the powered vessels plying the river keep the channel open.

When threatened by icing conditions, certain lighted buoys may be replaced by lighted ice buoys with reduced candlepower or by unlighted buoys, and certain unlighted buoys may be discontinued. (See Light List.)

Freshets occur at irregular intervals, but usually do not interfere with navigation below Alexandria unless accompanied by floating ice.

Pilotage is compulsory on the Potomac River for foreign vessels and U.S. vessels under register in the foreign trade. Pilotage is optional for U.S. vessels in the coastwise trade who have on board a pilot licensed by the Federal Government for these waters.

The Chesapeake and Interstate Pilots Association offers pilot services to U.S. vessels, engaged in the coastwise trade, and public vessels to any port or place on the Potomac River. Arrangements for pilots may be made through ships' agents or the pilot office in Norfolk (telephone, 804-855-2733; cable, CINPILOT). Pilots will meet vessels entering from sea at Cape Henry (discussed in chapter 9), and will meet a vessel at its port if it is on the Chesapeake Bay and its tributaries or Delaware Bay and River and provide all pilot services directly to the Potomac River.

The Virginia Pilots Association offers pilotage to any vessel bound for a port in Virginia or Washington, D.C. The Association of Maryland Pilots offers pilotage to any vessel bound for a port in Maryland or Washington, D.C. (See Pilotage, chapters 3 and 9.)

Charts 12233, 12285.–Potomac River is entered between

Smith Point and Point Lookout; the width of the entrance, normal to the channel, is about 5 miles.

The **fishtrap** areas in the lower river are shown on the charts. **Danger zones** for military testing operations extend from the mouth of the river to about 4 miles above the Potomac River Bridge, Mile 43.4. (Limits and regulations are given in **334.230,** chapter 2.) When military firing operations are in progress in the danger zones, range patrol boats with white hulls and international orange superstructures, and shoreline spotters, are stationed near the firing areas. The range patrol boats display a square red flag during daylight hours and an all-round red light from the mast at night. Surface traffic on the range is controlled by the range patrol boats and the shoreline spotters on VHF-FM channel 16.

Smith Point, the southerly entrance point, is low and inconspicuous. A shoal area that extends eastward from the point has depths as little as 8 feet 2 miles from shore; a buoy marks the northeast edge of the shoal. An unmarked sunken wreck is about 1 mile northwest of the buoy, in about 37°54.9′N., 76°12.7′W.

Smith Point Light (37°52.8′N., 76°11.0′ W.), 52 feet above the water, is shown from a white square brick tower and octagonal dwelling on a brown cylindrical pier about 2.5 miles east-southeast of the point; a radiobeacon and fog signal are at the light. A fairway buoy 1.5 miles from the light marks the separation lane of the **Traffic Separation Scheme (Smith Point)** for the bay ship channel. (See chart 12225.) The Scheme is discussed in chapter 9. In January 1980, an obstruction was reported in the northbound traffic lane, about 2 miles east-southeast of Smith Point Light, in about 37°52.4′N., 76°08.6′W.

Little Wicomico River, used by local fishermen and pleasure craft, empties into the Potomac River and Chesapeake Bay at Smith Point. A marked dredged channel leads from the Potomac River and Chesapeake Bay junction through a jettied entrance to a marked natural channel in the river. In 1983, the controlling depth was 3½ feet (5½ feet at midchannel) in the entrance channel. In July 1984, a depth of 4 feet was reported in the entire width of the channel between the jetties. Inside the entrance a depth of about 6 feet can be carried for 4 miles upriver with local knowledge. The approach to the river is marked by a light. A daybeacon and a light are on the ends of the north and south jetties, respectively, and daybeacons mark the upper reaches of the river to a point about 3 miles above the entrance. The entrance is subject to shoaling due to the strong current between the jetties; mariners are advised to exercise caution.

Slough Creek, marked by private daybeacons, empties into the south side of Little Wicomico River about 0.6 mile above the entrance. Small-craft facilities on both sides of the creek can provide gasoline, diesel fuel, water, ice, berths, and some marine supplies.

Cable ferry.–A cable ferry crosses Little Wicomico River at **Sunnybank,** 1.5 miles above the entrance. The ferry carries passengers and vehicles. The ferry operates between the hours of 0700 and 1900, Monday through Saturday, and 0700 to dark during the winter months. When the ferry is underway, the unmarked cable is suspended about 3 feet above the water surface, and is dropped to the bottom when not underway. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

Small-craft facilities, on the north side of the river about 2.9 and 3.6 miles above the entrance, can provide gasoline, water, ice, berths, and marine supplies. A marine railway at the facility can handle craft up to 60 feet for hull and engine repairs.

Point Lookout, the northerly entrance point of Potomac River, is low, but well marked by a silver elevated water tank; a 195-foot lighted communications tower, and several buildings. The shoal that extends about 1 mile southward from the point is marked by **Point Lookout Light** (38°01.6′N., 76°19.3′W.), 39 feet above the water, shown from a skeleton tower with a green and red horizontal banded square daymark on pile structure; a seasonal fog signal is at the light.

Storm warning signals are displayed. (See chart.)

Cornfield Harbor, just inside Point Lookout, is sheltered from northerly and northeasterly winds; vessels bound up and down the bay frequently use it as an anchorage for the night. The shoaling is gradual, except off **Cornfield Point** and at the south end of the shoal that extends southward from Point Lookout; at these places the hard sand bottom drops off abruptly. An 18-foot spot, and rocks covered 16 and 17 feet, are about 0.7 mile westward from Point Lookout, and a 10-foot spot lies between them and the Point Lookout shore.

Lake Conoy is 0.8 mile north-northwest of Point Lookout. The lake is entered from Cornfield Harbor through a private channel marked by a light and daybeacons; in 1976, the reported controlling depths were 8 feet in the entrance and 6 feet in the basin and alongside the piers. The east side of the lake is the site of **Point Lookout State Park.** The State boating facility on the east shore of the lake has gasoline, water, ice, limited marine supplies, and a sewage pump-out station. No overnight berthing is permitted; anchorage in the basin is allowed in an emergency.

Coan River (38°00.0′N., 76°27.0′W.), Mile 7.8S, has depths of 13 to 7 feet for 4.5 miles to within 0.5 mile of the head. The river is used mostly by local oyster and fish boats. A 500-yard lane in the approach is kept clear of fishtraps; the initial course through the lane is **230°.** The entrance to Coan River is marked by buoys and a light, and is easy to navigate; the channel inside is marked at the critical points by daybeacons and bush stakes. In November 1984, shoals in the vicinity of Daybeacon 12 had reportedly reduced the channel width to about 30 feet. In 1979, shoaling to an unknown extent was reported in the channel about 200 yards eastward of Daybeacon 10 and about 200 yards eastward of the small point about midway between Daybeacons 14 and 16. The mean range of tide is 1.2 feet at the entrance.

Kingscote Creek, on the north side of Coan River 0.6 mile above the mouth, has depths of 8 feet for most of its 1-mile length. A shoal extends halfway across the entrance from the point on the west side. Gasoline, diesel fuel, water, ice, berths, and some marine supplies are available at the small-craft facilities on the east side of the creek at **Lewisetta.** Hull and engine repairs can be made; marine railway, 40 feet.

The Glebe, on the west side of Coan River 0.7 mile above the mouth, has depths of 9 to 13 feet to the forks 1.5 miles above the entrance. The channel in The Glebe is clear except for a shoal that extends well off from the point on the south side 0.6 mile above the entrance.

Stevens Point is on the west side of Coan River 1 mile above the mouth. The boatyard on the south side makes hull and engine repairs; marine railway, 40 feet. Gasoline, diesel fuel, and some supplies are available.

The grain wharf at **Bundick,** on the west side of Coan River 3.4 miles above the mouth, has depths of 9 feet at the outer end. **Coan** wharf, directly across the river from Bundick, is in ruins. The overhead power cable from Coan to Bundick has a clearance of 60 feet.

Smith Creek, Mile 8.5N, is used by many small fishing and pleasure boats, and has the best protection along this

part of the river from all winds. A depth of about 9 feet can be carried over the bar to the junction of the two main branches, 1.5 miles above the entrance light. The entrance is well marked. The lane through the fishtraps can be navigated on a course of **355°**.

Wynne, on the east side of the entrance to Smith Creek, has fish wharves with depths of 5 to 10 feet at their outer ends. Small-craft facilities on the east side of the creek, just above the entrance, can provide gasoline, diesel fuel, water, ice, berths, and marine supplies. Hull and engine repairs can be made. Largest haul-out capacities: marine railway, 85 feet; lift, 20 tons.

St. Marys River, Mile 9.7N, is 2 miles wide at the entrance and about 600 yards wide at St. Marys City, 5.5 miles up. The channel has depths of 20 feet or more to St. Marys City, then shoals gradually to 12 feet at **Martin Point** and to 8 feet at **Tippity Wichity Island,** 8 miles above the mouth. St. Marys River is sometimes used as an anchorage by the deeper draft vessels seeking shelter from heavy gales, but small boats prefer Smith Creek. The river has very little traffic other than local fishing craft. The course through the fishtraps off the entrance is **345°**. The mean range of tide is about 1.5 feet.

St. George Island, on the west side of the entrance to St. Marys River, is long, low, and sparsely wooded. The island is thickly settled, mostly by oystermen and fishermen, and is used to some extent as a summer resort. **St. George Bar** extends 1.3 miles southeastward from the island; a lighted buoy is about 1 mile southeastward of the outer end of the bar.

Island Creek, on the southeast end of St. George Island, is entered by a marked dredged channel which leads to fishing piers and a turning basin inside. In May 1984, the channel had a controlling depth of 3 feet, with 6 feet available in the basin.

St. George Creek, which joins St. Marys River along the northeast side of St. George Island, has a narrow, crooked channel with depths of about 9 feet for 3.5 miles; the channel is marked for about 2.8 miles. In 1970, shoaling was reported in the creek, about 0.2 mile northwest of Light 7; extent of shoaling not known. The creek is used extensively by oystering and fishing boats, and by pleasure craft.

A marked channel enters St. George Creek at the north end of St. George Island. The fixed bridge over the channel has a width of 35 feet and a clearance of 17 feet. Overhead power cables on both sides of the bridge have a clearance of 29 feet. In June 1983, the channel had a controlling depth of 2 feet.

The town of **Piney Point,** on the west side of St. George Creek 2.5 miles above the mouth, has several private wharves with depths of 5 to 8 feet.

Small-craft facilities in a cove 2.7 miles above the mouth on the west side of St. George Creek provide berths, gasoline, and water; repairs can be made.

At **Morgan Point,** on the west side of St. George Creek 3.5 miles above the mouth, is a boatyard where hull repairs can be made; marine railway, 40 feet. Gasoline, water, and berths are available.

Carthagena Creek enters the west side of St. Marys River about 3 miles above the mouth. The creek, marked by daybeacons and a light, is used chiefly by pleasure craft. A marina at **Dennis Point,** on the east shore of the creek about 1.1 miles above the mouth, can provide berths, gasoline, diesel fuel, and marine supplies. Hull and engine repairs can be made; mobile lift, 25 tons.

St. Inigoes Creek enters the east side of St. Marys River about 3.5 miles above the mouth. Depths of 11 feet can be carried to the junction of St. Inigoes Creek and **Church Cove,** 1.3 miles above the mouth. The creek is unmarked.

Molls Cove is on the east side of the creek, 0.6 mile above the mouth. **St. Inigoes Coast Guard Station** is on the west side of its entrance.

St. Marys City, at **Church Point,** on the east side of St. Marys River 5.5 miles above the mouth, was the original capital of Maryland. Few traces of the original town remain, but the statehouse was reconstructed in 1934 from the ruins of several other buildings nearby. A landing on the south side of the point has a depth of about 9 feet at the outer end.

Yeocomico River, Mile 10.2S, has depths of 19 to 12 feet to the forks 1.4 miles above the entrance. Lights mark the channel to the forks and bush stakes mark the edges of the tributary channels. The initial course through the fish stakes off the entrance is **244°**. The mean range of tide is 1.3 feet at the entrance and 1.2 feet at Kinsale.

There are small-craft facilities on the east side of **Shannon Branch,** the north fork of Yeocomico River, and one is on the south side of **White Point Creek,** the westerly arm of Shannon Branch. Gasoline, diesel fuel, water, ice, berths, and marine supplies are available. Hull, engine, and radio repairs can be made. An 85-foot marine railway is available in White Point Creek, and the largest marine railway in Shannon Branch can handle craft up to 42 feet.

West Yeocomico River, the west fork, has depths of 13 to 7 feet to **Kinsale,** on the southwest side 1.7 miles above the entrance. Gasoline, diesel fuel, water, ice, berths, and some marine supplies are available at a marina in the cove on the north side of the river east of **Allen Point,** 0.4 mile above the mouth. Hull and engine repairs can be made; a 30-ton lift is available. The fixed highway bridge at Kinsale has a width of 29 feet and a clearance of 8 feet. The bulkhead wharf has depths of 10 feet alongside; the grain elevators on the wharf are prominent. Gasoline, water, ice, berths, and marine supplies can be obtained at a marina at Kinsale. Hull and engine repairs can be made; lift, 6 tons.

South Yeocomico River, the south fork, has depths of 13 to 7 feet to **Lodge,** on the west side of **Lodge Creek** 2 miles above the entrance of the south branch. An overhead power cable with a clearance of 50 feet crosses Lodge Creek about 2.4 miles above the entrance. The fish wharf at **Mundy Point,** on the west side of the entrance, has depths of 6 feet at the wharf. Several small landings on the south side of the point have depths of 9 feet at their outer ends. In June 1979, a submerged obstruction was reported in the creek about 250 yards east-northeast of Harryhogan Point, in about 38°00′32″N., 76°32′23″W.

Harryhogan Point is on the west side of South Yeocomico River 1 mile south of the entrance. The marine railways at the settlement can handle vessels up to 80 feet. The north landing at the cannery has depths of 9 feet alongside, and the south landing has depths of 5 feet. The lumber-mill landing 0.2 mile southwestward has depths of 7 feet alongside.

Small-craft facilities are on the south side of Harryhogan Point and on the east side of Lodge Creek. Gasoline, diesel fuel, water, ice, berths, and marine supplies are available. Hull and engine repairs can be made. The largest marine railway in the area can handle craft up to 80 feet; a 20-ton lift is also available.

Piney Point (38°08.1′N., 76°31.8′W.) is at Mile 15.9N. An abandoned lighthouse tower and a former Coast Guard station are on the point. The former Coast Guard wharf and the small private landings east of Piney Point have depths of about 5 feet at their outer ends. Gasoline and some supplies are available at a dock about 1 mile northeast of the point.

A prominent T-head pier of an oil company extends 1,000

feet southwestward from Piney Point. The pier, marked by private lights, has depths of about 35 feet along its 684-foot outer face. The pier is owned and operated by L. P. Steuart Co.

Immigration, quarantine, and **customs** officials come from Baltimore upon notification by the maritime exchange that tankers are due at Piney Point; vessels are boarded at the pier.

Charts 12286, 12285.–Limits of the **fishtrap** areas that extend upriver as far as St. Clements Island are shown on the charts. **Danger zones** for military testing operations extend upriver to about 4 miles above the Harry W. Nice (Potomac River Bridge) Bridge (U.S. Route 301), Mile 43.4. (See **334.230,** chapter 2, for limits and regulations.)

Bonum Creek (38°05.7′N., 76°34.1′W.), Mile 16.0S, is entered from the Potomac River by a dredged channel which leads through jetties to an anchorage basin 0.4 mile inside. In April 1982, the controlling depth in the channel was 5½ feet to the basin; thence a depth of 6 feet was available in the basin. Daybeacons mark the channel to the basin. The creek is used chiefly by fishing craft.

Herring Creek, Mile 18.7E, is entered by a marked dredged channel and is protected on both sides of the entrance by jetties. In February 1987, the controlling depth in the entrance channel was 6 feet at midchannel; depths inside are 7 to 4 feet. Lights mark the outer ends of the jetties. A marina, on the south side of the entrance, has gasoline, diesel fuel, berths, and some marine supplies. Hull and engine repairs can be made; mobile lift, 20 tons. A fish pier with 6 feet at the outer end is just east of the marina fuel pier. Another marina is on the south side of the creek 1.2 miles above the entrance; depths of 4 feet are reported alongside the piers. Gasoline, water, berths, and limited marine supplies are available. Hull and engine repairs can be made; marine railway, 35 feet.

A shoal extends 0.5 mile offshore from **Ragged Point,** at Mile 19.1S. A light is near the outer edge of the shoal.

Lower Machodoc Creek, Mile 21.7S, has depths of 15 to 11 feet for 2 miles, thence the depths decrease to 4 feet at a point 4 miles above the entrance. The critical points are marked as far as the narrows 2.2 miles from the entrance; the shoals are usually bush-staked.

Branson Cove, on the east side of Lower Machodoc Creek 1 mile above the entrance, is entered by a marked dredged channel which leads to a boat basin inside. In 1983, the controlling depth was 6 feet to the basin; thence depths ranging from 1½ feet at the edge to 7 feet in the middle were available in the basin. **Coles Point,** the village along the north shore of the cove, has piers with depths of about 6 feet at the outer ends. A large oyster-packing plant is on the north side of the entrance to the cove. Small-craft facilities in the cove can provide gasoline, diesel fuel, water, ice, berths, and marine supplies. Hull and engine repairs can be made; largest marine railway, 40 feet.

Nomini Bay, Mile 25S, has depths of 20 to 15 feet in the middle, and is the approach to Nomini Creek and Currioman Bay. The shoaling is abrupt on the east side of the bay and gradual on the west side.

Nomini Creek has a depth of about 5 feet to the second bridge, 5 miles above the entrance, thence 3 feet for 0.5 mile. There is a long jetty on the east side of the entrance to the creek, and the narrow entrance channel is marked. The mean range of tide is 1.5 feet. Traffic on the creek consists chiefly of seafood and fertilizer.

Mariners should be alert for unmarked fishtrap structures in Nomini Creek.

The highway bridge at **Nomini,** 3.7 miles above the entrance, has a swing span 39 feet wide in the west opening, and a clearance of 5 feet; the east opening is not used. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) In 1983, a 45-foot fixed span highway bridge with a design clearance of 18 feet was under construction just above the swing bridge. Upon completion, it will replace the swing bridge. The fixed highway bridge at **Prospect Hill,** 5 miles above the entrance, has a 30-foot span with a clearance of 10 feet.

Gasoline, diesel fuel, water, and ice are available at Nomini. The landings have depths of about 7 feet at their faces.

Currioman Bay is separated from the west side of Nomini Bay by **Hollis Marsh,** a narrow 2-mile-long spit which is wooded in the middle. Currioman Bay has depths of 7 to 10 feet in the entrance from the head of Nomini Bay and in most of the area back of Hollis Marsh; the entrance from Potomac River at the northwest end of Hollis Marsh has depths of only 2 to 3 feet. The entrance from Nomini Bay is marked by buoys and a daybeacon.

Breton Bay, Mile 25.2N, is a favorite anchoring ground for yachts. Commercial traffic consists chiefly of petroleum products. Drafts using the bay are mostly 6 feet or less, but occasionally vessels drawing up to 11 feet come inside.

The bay has depths of 15 to 11 feet for 4.5 miles, thence about 5 feet to Leonardtown, 5 miles above the entrance.

A 1,000-yard lane extends through the fishtraps off the entrance to Breton Bay; the initial course through the lane is **352°.** The shoal that extends eastward from Heron Island Bar to the Breton Bay approach is marked by an obstruction buoy, and another shoal that extends southwestward from **Huggins Point,** on the east side of the entrance, is marked by a light near its outer end. In September 1980, an obstruction was reported in the east side of the entrance to Breton Bay about 100 yards south of Daybeacon 4, in about 38°14′17″N., 76°41′28″W. Daybeacons and lights mark the bay channel to within 0.5 mile of Leonardtown. The mean range of tide is 1.7 feet at Leonardtown.

Combs Creek, on the north side and 1.6 miles above the mouth of Breton Bay, had a reported controlling depth of 5 feet along the middle of the creek in September 1980. The narrow entrance is between shoal spits marked by daybeacons and stakes. Gasoline and marine supplies are available. The marine railways on the west side of the creek can handle boats up to 50 feet for hull and engine repairs. An overhead power cable 0.2 mile above the mouth has a clearance of 50 feet.

A channel with a controlling depth of 6 feet, marked by piles, leads into the bight just southwestward of the entrance to Combs Creek. Gasoline, berths, and some supplies can be obtained.

Lovers Point is on the east side of Breton Bay 3 miles above the mouth. A bar with depths of less than 1 foot extends 500 yards northwestward from the point and is marked at its outer end by a light. An unmarked obstruction, submerged at low water, is reported to exist about 200 yards north-northeastward of the light.

Buzzard Point is on the west side of Breton Bay 4.5 miles above the mouth. A light marks the outer end of a bar that extends off the point.

Leonardtown, on the north side of Breton Bay 5 miles above the mouth, has a town wharf with 14 feet reported alongside; gasoline is available.

St. Clements Island is at Mile 27.0N. Near the south end of the thinly wooded island is a prominent cross which commemorates the first Catholic mass by English settlers in America on March 25, 1634. Shoals extend from the island in all directions. The long pier on the northeast side of the

island has a depth of about 16 feet at the outer end; supply and fishing boats use the pier.

Heron Island Bar, about 1 mile eastward of St. Clements Island, is an extensive shoal area mostly covered at low water; the bar is marked at the eastern and western ends by buoys.

St. Clements Bay, north-northeastward of St. Clements Island, has three entrances. The eastern entrance, between Heron Island Bar and the mainland, is by the way of the Breton Bay lane through the fishtraps; this entrance has depths of 20 to 16 feet and is easily followed in the daytime. The middle entrance, between Heron Island Bar and St. Clements Island, has depths of 15 feet or more and is approached through a 500-yard lane in the fishtraps on an initial course of **352°**; this entrance is narrow and crooked, but is marked by a light and buoys and is easily followed in the daytime.

Dukeharts Channel, the western entrance, leads from the Potomac River to St. Clements Bay between St. Clements Island and the mainland 0.5 mile to the north-northwestward. The controlling depth is 5 feet. **Note: Aids in Dukeharts Channel are placed for a passage from east to west.**

St. Clements Bay has channel depths of 14 feet for 3 miles, then shoals gradually to 8 feet 5 miles above the entrance. The mean range of tide is 1.8 feet.

St. Patrick Creek, on the west side of St. Clements Bay 0.5 mile above the mouth, is entered through a marked dredged channel. In May 1987, the midchannel controlling depth in the dredged channel was 6 feet. The creek is much frequented by fishermen, oystermen, and pleasure craft. There are several small-craft facilities along the creek above **Palmers,** on the south side 0.4 mile above the entrance. (See the small-craft facilities tabulation on chart 12285 for services and supplies available.) The **speed limit** is 6 miles per hour in the creek.

Canoe Neck Creek is on the west side of St. Clements Bay about 1.5 miles above the mouth. The entrance to the creek has a depth of 11 feet, except for a shoal reported encroaching the channel from the north entrance point. The creek shoals gradually from 11 feet at the entrance to 3 feet near the head. The landings at **Morris Point,** on the south side just above the entrance, have depths of 4 to 7 feet at the outer ends. A small-craft facility on Morris Point can provide gasoline.

St. Catherine Sound, Mile 29.0N, has depths of 5 to 9 feet behind **St. Catherine Island.** Two marked dredged channels lead into the sound; one at the northwesterly end and the other at the southeasterly end. In 1978-December 1979, the northwesterly channel had a controlling depth of 6 feet. In 1971, 6 feet was available on the centerline in the southeasterly channel. In May 1983, partially submerged pilings were reported in the sound near the southeasterly channel north and east of St. Catherine Island in about 38°14′12″N., 76°47′20″W. and 38°14′35″N., 76°47′45″W. The wharves along the shore of the sound are privately owned.

Whites Neck Creek, on the north side of St. Catherine Sound, has depths of 4 feet in the entrance and 6 to 2 feet inside. A State pier on the west side just inside the entrance has depths of 4 feet at the outer end; fuel and some supplies are available. The marine railway just upstream can handle boats up to 45 feet for hull and engine repairs.

Wicomico River (38°15.0′N., 76°49.6′W.) is at Mile 31.0N. Its commercial traffic consists chiefly of shellfish vessels. Drafts of vessels using the river are mostly 6 feet or less.

The river is characterized by long spits, with little depth and abrupt outer ends, which extend to the edges of the channel in several places. The entrance is 1.3 miles wide between **St. Margaret Island** on the east and **Cobb Island** on the west. **Cobb Point Bar,** which extends 1 mile southeastward from the island, is marked at the outer end by a light; the shoal extending 0.6 mile westward from St. Margaret Island is marked by a daybeacon.

The Wicomico River channel has depths of 40 to 12 feet for 5 miles, thence 6 feet with local knowledge for 3 miles, and then decreasing to 3 feet to the head, 11 miles above the mouth. The channel is marked at the most critical points for about 8 miles. The mean range of tide is 1.9 feet.

An overhead power cable with a clearance of 46 feet crosses the river about 10 miles above the mouth. Three suspension towers in the river support the cable.

Neale Sound, on the west side of the entrance to Wicomico River between Cobb Island and the mainland, had reported depths of 3 to 12 feet in August 1981, and affords secure anchorage for small boats. Both entrances are marked by lights, and the critical part of the channel at the northwest end is marked by daybeacons.

In December 1981, the controlling depth into Neale Sound was 6 feet from the Potomac River entrance through the west cut, thence in August 1981, the reported controlling depth was 4 feet from the Wicomico River entrance through the east cut. The highway bridge over Neale Sound has a 34-foot fixed span with a clearance of 18 feet.

Several small-craft facilities are on both sides of Neale Sound at the bridge. (See the small-craft facilities tabulation on chart 12285 for services and supplies available.)

Bushwood Wharf is on the east side of Wicomico River 1.5 miles above the mouth. A State pier and a gasoline pier have alongside reported depths of 8 and 4 feet, respectively. Gasoline and some supplies are obtainable.

Charleston Creek, on the west side of Wicomico River 3 miles above the mouth, is used by oyster boats as an anchorage.

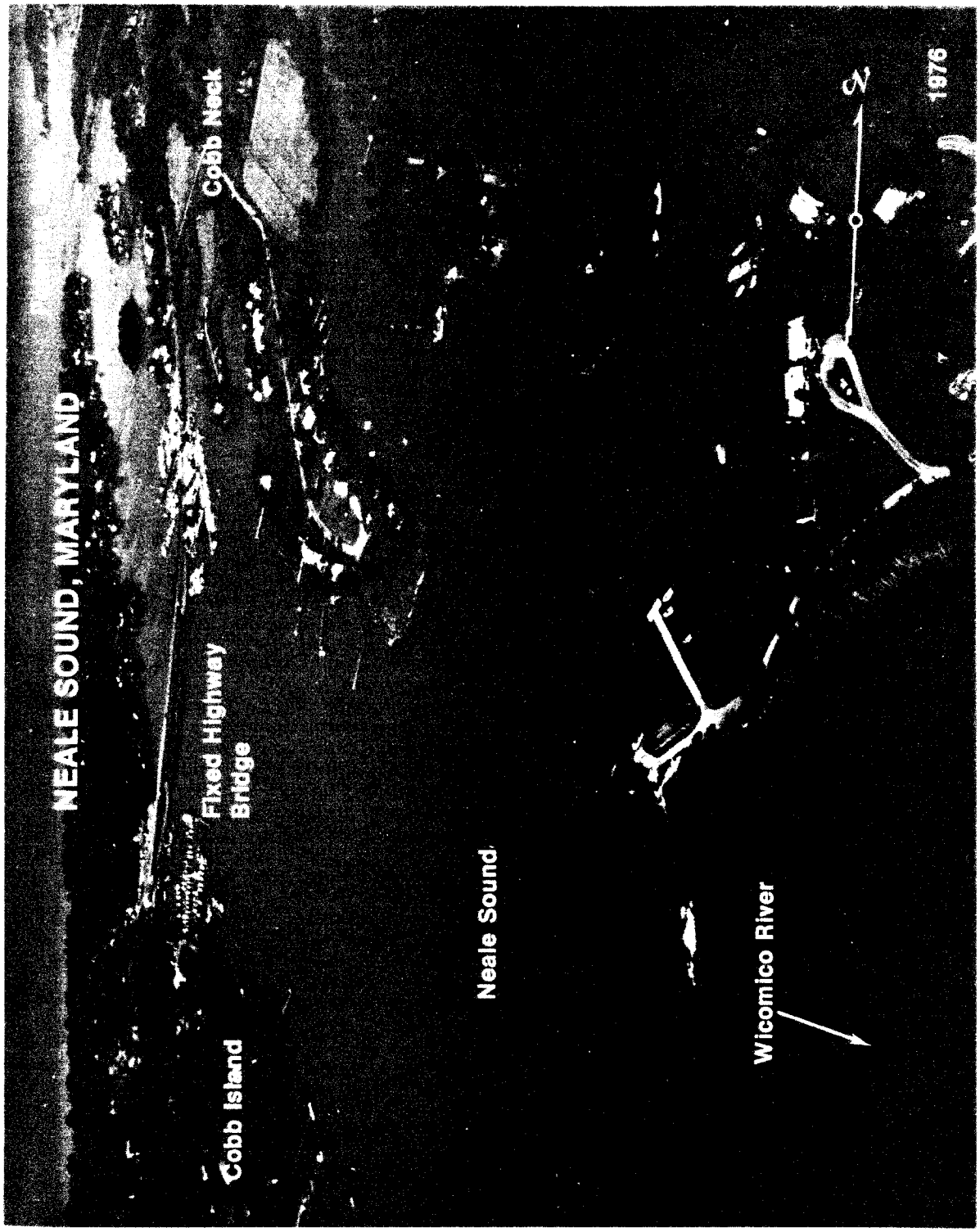
From Nomini Bay to within 2 miles of Popes Creek (38°11.6′N., 76°54.2′W.) the Virginia shore of Potomac River is backed by high ground. Along this stretch are **Nomini Cliffs, Stratford Cliffs, Horsehead Cliffs,** and the valleys between them.

Popes Creek, Mile 33.5S, leads to **Wakefield** and the **George Washington Birthplace National Monument.** The controlling depth is about 1½ feet in the entrance, and a stone jetty 2 feet high extends 200 feet offshore from the point on the north side. Current velocity up to 4.5 knots has been reported in the entrance.

Mattox Creek, Mile 36.1S, has depths of 7 to 5 feet in a marked narrow channel for 2 miles to **Fox Point,** then the depths decrease to 3 feet at the fixed concrete highway bridge, 4 miles above the entrance. A small-craft facility is on the east side of the creek south of Fox Point. Gasoline, water, ice, berths, some marine supplies, and a sewage pump-out station are available; engine repairs can be made.

Colonial Beach, Mile 36.5S, is a summer resort just north of Mattox Creek. The largest of the piers on the river side of the town is the municipal 450-foot T-head pier 1.2 miles above the south end. The pier has reported depths of 6 feet at the outer end.

Monroe Creek, back of Colonial Beach, is entered between **Gum Bar Point,** at the south end of the town, and **Sebastian Point,** 150 yards westward. The creek is used extensively as an anchorage. The dredged channel, marked by lights and daybeacons, leads from the entrance of the creek to a basin at **Robins Grove Point** at Colonial Beach. In March 1982, the controlling depth was 7 feet over the bar in the entrance channel off **Gum Bar Point;** thence in April 1980, a controlling depth of 6 feet was on the centerline in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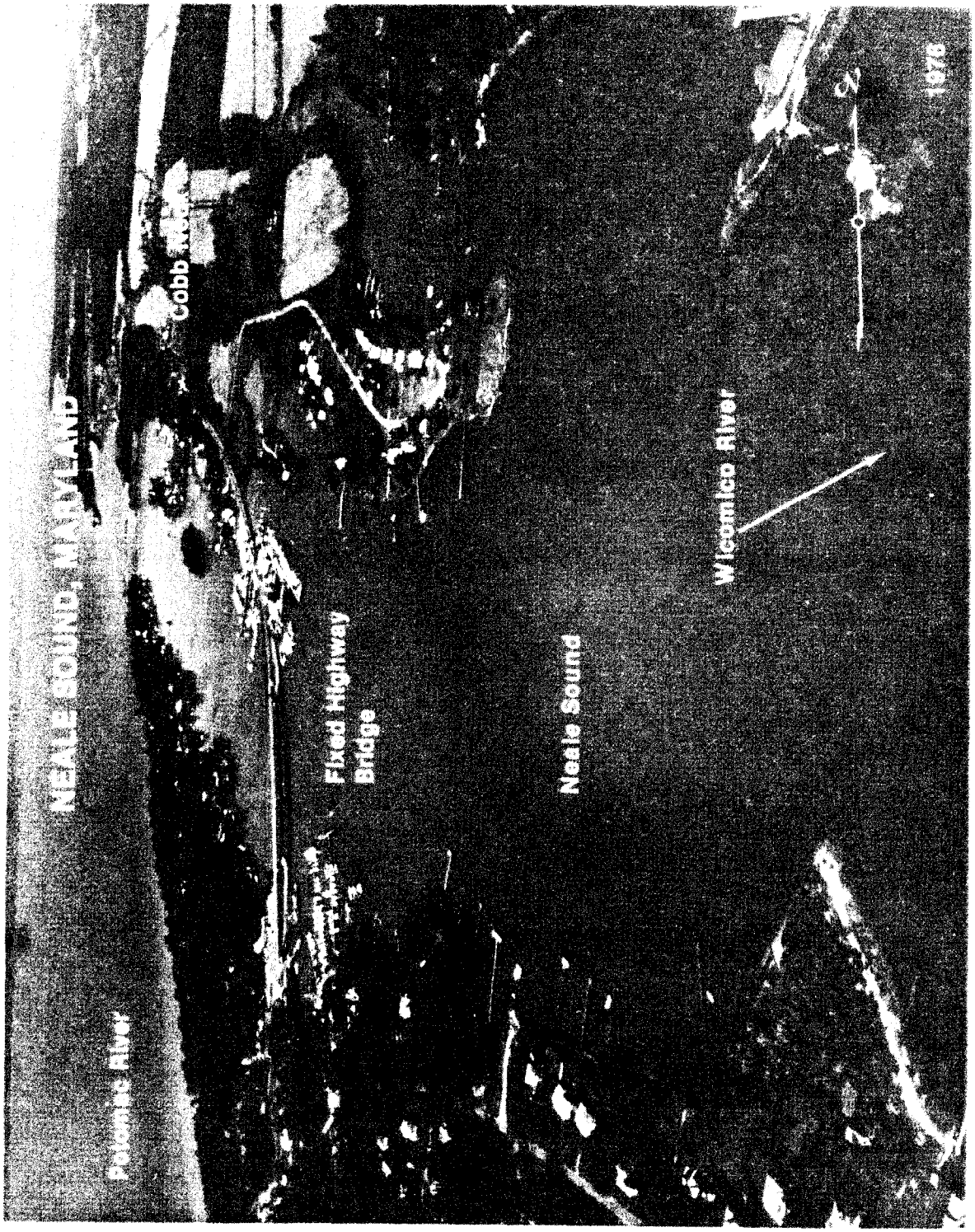

NEALE SOUND, MARYLAND
Potomac River
Cobb Island
Fixed Highway Bridge
Neale Sound
Wicomico River
1978

the remainder of the channel to the basin, and 5 to 7 feet was available in the basin. The entrance is narrow and mariners are requested to transit at low speed to avoid wash damage to vessels moored in the creek.

There are numerous small-craft facilities along the east side of the creek below and above Robins Grove Point, and a yacht club is on the eastern side of the entrance to the creek. (See the small-craft facilities tabulation on chart 12285 for services and supplies available.)

Charts 12287, 12285.–Potomac Beach is at Mile 38.8W. A private pier is the only usable landing. In July 1982, a reported depth of 2 feet was available to the landing.

Rosier Creek, entered just westward of Potomac Beach, has depths of 2 feet in the entrance and 5 to 2 feet for 1 mile upstream. The creek has no wharves and is little used.

Upper Machodoc Creek is at Mile 40.2W. The **Naval Surface Weapons Center** is at **Dahlgren,** on the north side of the entrance to the creek, but also occupies land for a considerable distance along the south shore; the center monitors VHF-FM channel 16 (156.80 MHz). (See **334.230,** chapter 2, for the limits and regulations governing the danger zones.) The tanks and radio masts at Dahlgren are prominent.

Two well-marked, Navy-maintained channels lead from Potomac River to the basin and wharves at Dahlgren. In July 1982, the main channel leading from westward, and the cutoff channel leading from southeastward, had reported centerline controlling depths of 8 feet and 7 feet, respectively. A **282°** lighted range marks the main channel. The mean range of tide is 1.6 feet.

Above Dahlgren, Upper Machodoc Creek has depths of 7 to 4 feet to **Little Ferry Landing,** 3.5 miles above the entrance, thence 7 to 2 feet for another 2 miles to **Milford Landing.** Only small piers are found along the banks. A fixed highway bridge with a 47-foot span and a clearance of 10 feet crosses the creek 3.7 miles above the entrance. Overhead power cables across the creek have a least clearance of 35 feet.

Williams Creek, on the north side of Upper Machodoc Creek 1 mile above the mouth, has depths of 4 to 2 feet to the highway bridge 1.1 miles above the entrance. An overhead power cable 0.6 mile above the entrance has a clearance of 28 feet.

A marina is on the north side of the entrance to Williams Creek. Gasoline, water, ice, berths, and some marine supplies are available. Hull and engine repairs can be made; lift, 10 tons.

Lower Cedar Point is at Mile 42.1E. A light is shown from a white skeleton tower on piles in depths of 3 feet on the west edge of the main channel 0.7 mile westward of the point.

Morgantown is on the south side of Lower Cedar Point. There are strong cross currents south of the point. The landings that remain intact are suitable only for small boats.

Charts 12288, 12285.–The **Harry W. Nice (Potomac River) Bridge,** (U.S. Route 301), Mile 43.4, has a fixed channel span with clearances of 135 feet for a width of 480 feet and 105 feet for a width of 700 feet. The centerline of the main span has a fog signal and is marked by a flashing red aviation obstruction light and by a fixed green light surmounted by three fixed white lights vertically 15 feet apart. The bridge is also marked by fixed red lights on the main trusses and approaches.

There is a small-boat basin and marina just above the Harry W. Nice Bridge on the Maryland side. The entrance channel and basin have depths of about 6 feet. Gasoline, diesel fuel, berths, and marine supplies are available. Hull and engine repairs can be made; lift, 20 tons.

A **danger zone** for military testing operations extends 4 miles upriver from the Harry W. Nice Bridge. (See **334.230,** chapter 2, for limits and regulations.)

Persimmon Point is at Mile 44.5W. A 3-foot shoal on the west edge of the channel 0.6 mile southeastward of the point is marked by a buoy.

Popes Creek, Mile 45.4E, is not navigable. The village of **Popes Creek** 0.2 mile northward, has limited quantities of gasoline available at a crabhouse pier. The former railroad wharf is in ruins.

Between Popes Creek and Upper Cedar Point, 4.5 miles upriver, the Maryland shore of Potomac River bends northward about 2 miles to form **Port Tobacco River Flats,** which have shoal spots of 3 to 5 feet but generally navigable depths of 7 to 10 feet. **Port Tobacco River,** at the head of the bight, has depths of 7 feet for 1.6 miles and thence 5 to 3 feet for another 1.3 miles. A light and daybeacons mark the channel. An obstruction visible at low water has been reported 0.3 mile off Chapel Point near Daybeacon 3. The mean range of tide is 1.5 feet.

Chapel Point, on the east side of Port Tobacco River 1.2 miles above the mouth, is a summer resort. **Port Tobacco,** 4.4 miles above the entrance, is now the head of practical navigation. Marinas at the town have gasoline, berths, and some supplies. Hull and engine repairs can be made; lift, 15 tons.

Mathias Point is at Mile 47.7S. A light is shown from a skeleton tower on piles in depths of 3 feet on the south edge of the main channel 0.3 mile northward of the point.

Upper Cedar Point, at Mile 50.0N, is marked by a light shown from a skeleton tower on piles in depths of 3 feet on the north edge of the channel 0.5 mile southeastward of the point. Give the light a berth of at least 200 yards.

Nanjemoy Creek, Mile 51.0N, has a controlling depth of about 4 feet in a privately marked channel to a small-craft launching ramp about 4 miles above the entrance.

Metomkin Point is at Mile 53.1S. A light, shown from a pile structure in depths of 1 foot 0.5 mile off the point, marks the shallowest part of a shoal area along the southeast edge of the channel.

Maryland Point Light 17A (38°21.0′N., 77°11.9′W.), Mile 55.8S, 42 feet above the water, is shown from a skeleton tower with a square green daymark on piles in depths of 9 feet on the south edge of the Potomac River channel 0.7 mile southeastward of **Maryland Point.** Other shoals east and west of the light are marked by buoys.

Two white dish-shaped antennas 1.4 miles northwest of Maryland Point are conspicuous.

Gasoline and some supplies can be obtained at **Fairview Beach,** Mile 57.4S. Depths to the fuel pier are about 4 feet. Minor repairs can be made.

Potomac Creek, Mile 58.5S, is used only by small motorboats. **Bull Bluff,** on the south side of the entrance, is high and wooded. The creek has depths of 7 feet in the entrance, thence 3 feet for 2 miles. The best water favors the south side of the entrance. Gasoline and water are available at small-craft facilities on the south side of the creek 1 mile and 2 miles above the entrance. Hull and engine repairs can be made at the more easterly facility.

Aquia Creek, Mile 60.4W, has depths of 4 to 5 feet to the railroad bridge, and thence 2 feet to **Coals Landing,** 5 miles above the mouth. The entrance to the creek is marked by lights and daybeacons. The mean range of tide is 1.3 feet. A fixed railroad bridge, 3 miles above the entrance, has a width of 46 feet and a clearance of 26 feet. An overhead power cable just south of the bridge has a clearance of 36

feet. Small-craft facilities are on the south side of the creek close above and below the bridge. (See the small-craft facilities tabulation on chart 12285 for services and supplies available.)

Smith Point, Mile 61.5E, is marked by a light. **Clifton Beach** is on the point. The broken piling of a former landing 300 yards south of the light is nearly awash at high water.

There is danger of striking submerged hulks in the mile-wide former restricted anchorage area that extended 2.5 miles upriver along the Virginia shore from directly opposite Smith Point.

Liverpool Point is at Mile 64.4E. **Mallows Bay,** on the north side of Liverpool Point, is a ship graveyard area; the western danger limit is a line from Liverpool Point to Sandy Point. A buoy marks the inner edge of the river channel off the bay. The southern part of the bay has unobstructed depths of 5 feet to the submerged wreck near the head. On the southern shore is a small bulkhead landing.

Sandy Point, Mile 65.5E, is marked by a light.

An aviation school wharf at Mile 66.2W has depths of about 8 feet at the outer end. The short dredged channel to the wharf has a reported controlling depth of about 6 feet. About 0.2 mile north of the wharf, a diversion canal 5 feet deep connects **Chopawamsic Creek** with the Potomac River; three fixed bridges over the canal have a minimum width and clearance of 10 feet. An overhead power cable between the two uppermost bridges has a clearance of 17 feet.

Quantico, Mile 67.7W, is a training site of the **U.S. Marine Corps**. The T-head pier has depths of 25 to 30 feet at the face, and the launch harbor immediately south of the pier has depths of about 10 feet. The pier has a fog signal on the outer end. Except in emergencies, the pier and harbor are restricted to government vessels.

Quantico Creek, Mile 68.2W, has depths of 7 feet in a narrow, crooked entrance channel, and about 2 feet for 2 miles upstream. The fixed railroad bridge over the entrance has a 29-foot span with a clearance of 8 feet. In July 1986, a replacement fixed railroad bridge with a 30-foot span and a design clearance of 12 feet was under construction immediately below the existing bridge. An overhead power cable along the west side of the bridge, and another one 1.3 miles above the bridge, have clearances of 8 feet and 41 feet, respectively. A small landing on the south side of the entrance is used by local pleasure boats. The mean range of tide is 1.4 feet.

Possum Point is at Mile 68.5W. A private light marks the powerplant wharf 0.2 mile northward of the point. An overhead power cable 0.8 mile above Possum Point has a clearance of 170 feet for a midwidth of 1,440 feet over the main channel, and 124 to 70 feet elsewhere. The six support structures for the cable are marked by lights.

Chicamuxen Creek, Mile 69.2E, has depths of 5 feet in the entrance, but shoals rapidly farther up. The creek is little used.

A **danger zone** of a Navy explosion test area includes part of Chicamuxen Creek and extends northeastward in Potomac River up to 0.5 mile off the Maryland shore for about 5 miles to Indian Head. (See **334.240,** chapter 2, for limits and regulations.)

An oil and asphalt terminal is at **Cockpit Point,** Mile 70.3W.

The Government wharf at the north end of **Stump Neck,** Mile 70.6E, has depths of 15 feet at the outer end and is marked by a light. Lights also mark the ends of the breakwater on the north side. Landing is permitted only in case of emergency.

Mattawoman Creek, Mile 71.5E, has easily navigated depths of 7 to 5 feet for 1 mile to the marsh that extends southeastward from **Deep Point** to the edge of the channel. The channel is marked by a daybeacon and lights. Above this marsh, the creek channel has greater depths for 3 miles, but meanders back and forth between the flats and is almost impossible to follow without a guide. The mean range of tide is 1.6 feet at the entrance. A pier and launching ramp for a public picnic facility is at **Sweden Point,** 2 miles inside the entrance. In October 1979, depths of about 3 feet were reported available to the dock.

Powells Creek, Mile 71.1W, has depths of 4 to 5 feet in the approach and 1 to 2 feet through the railroad bridge and for a short distance upstream. The fixed railroad bridge 0.3 mile above the entrance has a width of 40 feet and a clearance of 26 feet. An overhead power cable at the bridge has a clearance of 45 feet.

Charts 12289, 12285.–Occoquan Bay, Mile 73.8W, has general depths of 5 to 7 feet. The entrance is 2.5 miles wide between **Freestone Point** on the southwest and **High Point** on the northeast; the channel is 0.3 mile off High Point. A manmade rocky islet, 5 feet high, is near the center of the bay, 1 mile westward of High Point. The bay has little commerce; it and its tributaries are used as an ice harbor when the river channel is closed above.

Neabsco Creek, at the southwest side of Occoquan Bay north of Freestone Point, has depths of 4 to 2 feet. The fixed railroad bridge over the mouth has a 30-foot span with clearance of 33 feet. The overhead cables just west of the bridge have a clearance of 36 feet. Gasoline, berths, water, and marine supplies can be obtained at the small-craft facilities on the south side of the creek above the bridge. Hull and engine repairs can be made; lifts up to 12 tons.

Belmont Bay, the northeastern arm of Occoquan Bay, has general depths of 3 to 4 feet. Belmont Bay is said to be rocky throughout; the rocks are covered at low water except during northwest winds.

Occoquan River empties into the head of Occoquan Bay along the west side of Belmont Bay. The river has natural depths of 7 to 25 feet. A channel leads through the bay and river to Occoquan. In 1973, the channel had a controlling depth of 4 feet, but in 1975, shoaling to 1½ feet was reported between Daybeacons 4 and 7, and a rock awash was reported just outside the channel in 38°37′58″N., 77°12′57″W. The channel is marked through Occoquan Bay to the first bridge over Occoquan River. The mean range of tide is 1.6 feet at the entrance.

Three fixed bridges, one railroad and two highway, with a least clearance of 65 feet cross Occoquan River 3.6 miles above the bay entrance. In February 1981, the southerly fixed highway bridge was under construction; design clearance, 63 feet. Piles extend out into the channel on both sides of the first bridge. An obstruction, covered 1 foot, is on the north side of the third bridge, in about the center of the river. Twin fixed highway bridges, 4 miles above the entrance, have a clearance of 44 feet. A fixed highway bridge, 5 miles above the entrance, has a clearance of 25 feet. A rock awash is on the north side of the bridge, in about the center of the river. A power cable just northwestward of the bridge has a clearance of 44 feet.

Occoquan, on the southwest side of Occoquan River 5 miles above the bay entrance, is the head of navigation. Channel depths off the Occoquan bulkheads are about 10 feet. Small-craft facilities, on the southwest side of the river above the first bridge, can provide gasoline, water, berths, and marine supplies. Hull and engine repairs can be made; largest mobile hoist, 15 tons.

Indian Head, Mile 75.3S, is a high wooded bluff. The town of **Indian Head** is back of the bluff. The lower wharf

has depths of 12 feet off its northern face, and the small-boat basin on the lower side has depths of 4 feet. A fog signal is on an intake house just above the wharf. The upper wharf has depths of 12 to 15 feet at the face. Landing is permitted at either wharf only in case of emergency. Mariners are advised to use caution in the vicinity of the upper wharf because divers may be training in the area.

Craney Island, Mile 77.3W, is a tiny islet marked by a clump of trees and surrounded by an extensive shoal. Between the islet and the Virginia shore is a narrow unmarked channel with depths of 7 feet.

Pomonkey Creek, Mile 78.0E, has depths of 7 to 3 feet in the entrance but little water inside.

Gunston Cove, Mile 80.0W, has depths of 3 to 5 feet in the entrance and 5 to 7 feet inside. The peninsula between Gunston Cove and Dogue Creek, 2 miles to the northeastward, is a part of the U. S. Army reservation of **Fort Belvoir.**

The small-boat basin and facilities at **Whitestone Point,** on the north side of the Gunston Cove entrance, are part of Fort Belvoir and are not for public use. A **restricted area** is established off Whitestone Point. (See **334.250,** chapter 2, for limits and regulations.)

Pohick Bay and **Accotink Bay,** which joins at the head of Gunston Cove 2 miles from the entrance, have depths of 2 to 3 feet for about 0.5 mile from the junction. Pohick Bay is foul with submerged duckblind and fish stakes. Parts of both bays are within the **danger zone** of a Fort Belvoir target range. (See **334.230,** chapter 2, for limits and regulations.)

Dogue Creek, Mile 81.9W, is used by small craft. A privately marked channel leads from the river across the northwest part of the estuary to the mouth of the creek. In February 1980, reported depths in the channel were 3 feet, with 1 to 5 feet in the creek. The extreme north corner of the estuary is foul with grass and submerged duckblind stakes.

Marshall Hall, Mile 82.3S, formerly an amusement park, has a wharf with about 10 feet reported alongside. The wharf is in poor condition; landing is not permitted.

Mount Vernon, the home of George Washington, is at Mile 83.2N. The custom of tolling the ship's bell while passing Mount Vernon is said to have originated the night of Washington's death, December 14, 1799. The buildings are open to the public daily from 0900 to 1700 during the summer and 0900 to 1600 during the winter. Excursion boats operate between Mount Vernon and the city of Washington, D.C. The buoyed dredged channel leading to Mount Vernon wharf had a controlling depth of 8½ feet in February 1984.

Little Hunting Creek, Mile 83.9N, has depths of 2 feet in the approach and about 4½ feet in a narrow channel, sometimes marked by bush stakes, for about 0.6 mile above the entrance. A stone-arch bridge over the entrance has a clearance of 22 feet for a center width of 25 feet.

Piscataway Creek, Mile 85.4S, has depths of 1 to 3 feet. Some marine supplies, gasoline, diesel fuel, and berths are available at a marina on the north side of the creek 0.5 mile inside the entrance. Hull and engine repairs can be made; mobile hoist, 25 tons.

Fort Washington, Mile 85.8E, was built early in the 19th century for the protection of the then new Nation's capital; the fort is now a unit of National Capital Parks. There is a light on shore at the fort.

Broad Creek, Mile 88.0E, has depths of 2 to 4 feet. **Indian Queen Bluff** is on the north side of the entrance. The creek is little used.

Rosier Bluff, Mile 89.4E, is wooded and prominent. Only piles remain of the wharf just below the bluff. A light is shown from a pile in depths of 6 feet, below the bluff.

Hunting Creek, Mile 90.0W, has depths of 1 to 4 feet. Fixed highway bridges cross the creek 0.6 and 0.9 mile above the entrance. The lower bridge is a three-arch structure with a width of 44 feet and a clearance of 9 feet for a width of 20 feet; the upper bridge has a clearance of 3 feet. Piles marking an abandoned channel are in the north part of Hunting Creek entrance. Numerous tree trunks, logs, wrecks, mudflats, and other obstructions are in the entrance to the creek.

On the Maryland side opposite Hunting Creek is an extensive bight dredged for sand and gravel. Depths are 8 to 20 feet in the inner part of the bight but only 1 to 5 feet along the edge of the river channel.

Jones Point, Mile 90.5W, is on the north side of the entrance to Hunting Creek and at the lower end of the Alexandria waterfront. **Woodrow Wilson Memorial Bridge,** Mile 90.7, which connects Jones Point with the Maryland shore, has a bascule span with a clearance of 50 feet; a fog signal is at the channel span of the bridge. (See **117.1 through 117.59 and 117.255,** chapter 2, for drawbridge regulations.) Rocks awash are on the western edge of the channel just southward of the bridge in 38°47′24″N., 77°02′23″W.

Alexandria, Mile 91.4W, has some waterborne traffic. Foreign vessels drawing as much as 23 feet unload newsprint and some general cargo.

Pilotage to Alexandria was discussed at the beginning of the chapter.

Towage.–Tugs are not normally required for docking and undocking. No tugs are available at Alexandria or Washington, D.C.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Alexandria is a **customs port of entry.**

Harbor regulations.–Jurisdiction of the District of Columbia harbormaster extends upriver from Jones Point. Harbor regulations provide a **speed limit** of 10 m.p.h. when passing the wharf area of Alexandria, except in emergencies.

The Alexandria waterfront extends about 1.5 miles north of the Woodrow Wilson Memorial Bridge. Some of the wharves are owned by the Government; several of the privately owned wharves are open to the public by special arrangement. Depths of 20 to 25 feet are at the outer ends of the wharves; in places old piling is a hazard to approaching vessels. Robinson south and north terminals are 0.45 mile and 0.9 mile above the bridge, respectively; each has a 300-foot face with depths of 25 feet alongside. (For information on the latest depths alongside the facilities at Alexandria, contact the individual operators.) Water is available at most of the facilities; cargo is handled by ship's tackle. There are no major repair facilities for oceangoing vessels at Alexandria; the nearest such facilities are at Baltimore, Md., and in the Hampton Roads area.

Small-craft facilities along the Alexandria waterfront can provide gasoline, diesel fuel, water, berths, and marine supplies. Hull and engine repairs can be made; largest marine railway, 35 feet; lift, 16 tons.

Oxon Creek, Mile 91.6E, has bare flats in the approaches and general depths of 1 to 3 feet inside. Sand dredges have cut channels through the flats and made holes inside, but local knowledge is needed to find the deeper water. The fixed highway bridge over the creek has a clearance of 19 feet.

Marbury Point is at Mile 92.1E. A privately buoyed

channel with reported depths of about 12 feet leads to the point. Just northward is the Blue Plains sewage-disposal plant. The Government pier 0.4 mile above Marbury Point extends to deep water and is marked at its outer end by a light; use of the pier is restricted to Government vessels.

Fourmile Run, Mile 93.0W, has depths of 10 to 20 feet in the outer basin, but there is a 3-foot spot off the south side and shoal water surrounds the other sides. Airport landing lights extend 0.5 mile into the basin from the north side. In 1972-1974, shoaling to an unknown extent was reported in the marked entrance channel. The Washington Sailing Marina is in the cove on the south side of the basin just above the entrance.

Washington National Airport occupies the extensive fill area on **Gravelly Point** at Mile 94.1W. Many domestic airlines use the airport day and night.

Giesboro Point is at Mile 94.0E. Submerged pile remains of former wharves extend out about 150 feet from shore in the vicinity of the point.

Washington, D.C., on the east side of Potomac River 96 miles above the mouth, is the **Capital of the United States.** The city, with its impressive memorials and public buildings, is one of the most beautiful in the world and is host to a constant stream of visitors. Prominent from the river are the Capitol Dome, the Washington Monument, and the Lincoln and Jefferson Memorials.

Commercial traffic in Washington Harbor consists chiefly of petroleum products, sand, and gravel.

The mean range of **tide** is 2.9 feet; daily predictions for Washington are given in the Tide Tables. Currents are variable, but the set is usually in the directions of the channels, and there is little or no flood current during freshets; information for several places in Washington Harbor is given in the Tidal Current Tables. **Ice** closes the river at Washington during severe winters, but power vessels keep the channels open during ordinary winters. During the highest freshet in recent years, the river rose about 11.5 feet above mean low water in Washington Channel.

Weather.–Washington summers are warm and humid, and winters are mild; generally, pleasant weather prevails in the spring and autumn. The coldest weather occurs in late January and early February. The warmest weather occurs late in July. There are no well-pronounced wet and dry seasons. Thunderstorms, during the summer, often bring sudden and heavy rain showers and may be attended by damaging winds, hail, or lightning.

Tropical disturbances occasionally, during their northward passage, influence Washington's weather mainly with high winds and heavy rainfall, but extensive damage from this cause is rare. Snow accumulations of more than 10 inches are relatively rare. Usually the melt-off is rapid and conditions improve within a day or so.

Records of the past 20 years show the average date of the last freezing temperature in the spring to be March 29 and the latest, April 16. The average date of the first freezing temperature in the fall is November 10 and the earliest, October 21.

Occasional overflows from the Potomac River result from heavy rain over the basin, at times augmented by melting snow. In a few cases during cold winters, ice forms on the river, and, in spring, flooding is caused by ice gorges when the ice breaks up. The river is in tidewater, and above normal tides associated with hurricane or severe storms along the coast cause flooding at times. Local flooding in the area is also caused by locally heavy rain. Some flooding occurs from one or the other of these causes every year on the average.

In using the Climatological Tables for the area note that recent observations have been taken at the National Airport, which is in a warmer part of the area. Minimum and maximum temperatures in nearby areas may be 8° and 5° lower, respectively, and rain and snowfall amount may be slightly higher away from the airport. (See page T–9 for **Washington climatological table.**)

Pilotage to Washington, D.C., was discussed at the beginning of the chapter.

Towage.–There are no tugs at Washington, D.C. or Alexandria.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Washington, D.C. is a **customs port of entry.**

Harbor regulations.–The District of Columbia Harbormaster, who is the officer commanding the Harbor Precinct of the Metropolitan Police Department, regulates the operation, navigation, mooring, and anchoring of all vessels within the waters of the District of Columbia and enforces all laws and regulations relating thereto. The person in charge of any vessel, 26 feet or more long, entering the harbor, shall, if he intends to remain over 24 hours, report the date and time of arrival without delay and shall also report immediately before finally departing, to the harbormaster at the Harbor Precinct wharf, Maine Avenue and M Street, SW., or to any police officer under his command. Permission to anchor in the District of Columbia must be obtained from the harbormaster. Both the harbormaster and the police boat monitor VHF-FM channel 16; call sign KUF-703.

At Mile 94.2 is the junction of Potomac River with **Anacostia River** to the eastward, Washington Channel to the northward, and Georgetown Channel of the Potomac River to the westward. The lighted junction buoy also marks the outer end of the shoal making southerly from **Hains Point,** 0.4 mile north of the junction. **Washington Harbor** comprises the navigable waters upstream from this junction.

A dredged channel leads from the Potomac River off Hains Point into the Anacostia River to a turning basin at the foot of 15th Street, SE., about 2.6 miles above the mouth. In March-July 1980, the controlling depth was 9½ feet (11 feet at midchannel) from the junction buoy 0.3 mile south of Hains Point to the turning basin, thence 7 to 10 feet in the basin. Above the turning basin, depths of 5 to 8 feet can be carried to the Benning Road Bridge, about 4.5 miles above the mouth. In January 1980, the midchannel controlling depth was 2 feet to a marina at Bladensburg, about 7 miles above the mouth. The channel is well marked to the East Capitol Street Bridge. In 1975, underwater obstructions, depths unknown, were reported about 3.2 and 3.5 miles above the mouth of the Anacostia River in 38°53′00″N., 76°58′10″W., and 38°53′18″N., 76°57′48″W.; caution is advised.

Harbor regulations prescribe a **speed limit** of 6 m.p.h. between the entrance to Anacostia River and the Benning Road Bridge, a distance of 4.4 miles.

Anacostia River is crossed by 10 bridges between the entrance and the head of navigation. The Frederick Douglass Memorial Bridge (South Capitol Street Bridge), 1.4 miles above the entrance, has a swing span with a clearance of 40 feet. In April 1986, it was reported that the bridge is not tended. At least 24 hours notice is required for openings; telephone 202-727-5522. (See **117.1 through 117.59 and 117.253,** chapter 2, for drawbridge regulations.)

The Eleventh Street Bridge, 2.2 miles above the mouth, is a fixed bridge with a clearance of 28 feet. Twelfth Street Bridge has a fixed channel span with a clearance of 28 feet. The remaining fixed bridges have a minimum width of 40 feet and clearance of 12 feet. The ConRail Bridge, 3.3 miles above the mouth, has a vertical-lift span with a width of 33 feet and clearance of 5 feet down and 29 feet up. (See **117.1 through 117.59 and 117.253,** chapter 2, for drawbridge regulations.)

Overhead cables of unknown clearances cross the river on either side of the ConRail Bridge, about 6.5 miles above the mouth.

The waterfront of Anacostia River extends along the north side for about 3 miles above the entrance. The Washington Navy Yard Annex occupies the area just above the first bridge to the second bridge; depths at the outer piers are 19 to 23 feet. Most of the other piers and bulkhead wharves are privately owned. Oil terminals are just below the first bridge and just above the third bridge.

There are small-craft facilities on the north side of Anacostia River just above the mouth; between the third and fifth bridges; and at **Bladensburg,** 7 miles above the mouth. **Storm warning signals are displayed.** (See chart.) (See the small-craft facilities tabulation on chart 12285 for services and supplies available.)

Washington Channel extends northward along the east side of Hains Point for 2 miles to the Fourteenth Street causeway. In 1974–1977, the controlling depth was 14 feet from the junction buoy 0.3 mile south of Hains Point to within 50 yards of the head of the channel, thence 11 feet to the head of the channel. The channel is marked on its east side by buoys for about 0.6 mile above Hains Point. A fixed highway bridge at the upper end of the channel has a clearance of 37 feet.

Harbor regulations prescribe a **speed limit** of 6 m.p.h. upstream from Hains Point.

The waterfront facilities are on the eastern side of Washington Channel. Pier 5, 1 mile above Hains Point, has depths of about 23 feet at the outer end; it is the headquarters of the harbormaster and is used by his patrol boats and Police and Fire Department. Pier 4, just northward, has depths of about 23 feet at the outer end; it is used by excursion boats. The municipal fish and fresh oyster wharves are just below the highway bridge, 1.5 miles above Hains Point.

Slips and minor repair facilities for pleasure craft are at the north end of Washington Channel; largest haul-out capacity: lift, 20 tons. Diesel fuel and marine supplies are available.

Georgetown Channel is that part of the Potomac River between Hains Point and just above Chain Bridge. In 1974–77, a depth of 12 feet could be carried through the buoyed channel to Buoy 6, thence by favoring the west shore 11 feet to about 0.4 mile below Arlington Memorial Bridge, thence 14 feet at midchannel to the Francis Scott Key Bridge at Georgetown. The channel from Key Bridge to Chain Bridge, about 2.7 miles above, has unpredictable currents, and numerous shoals and rocks. This part of the channel is used by small craft with local knowledge; mariners are advised to exercise caution.

Georgetown Channel is crossed by eight bridges between Hains Point and Chain Bridge, Mile 101. All bridges have either fixed spans or drawspans fixed in the closed position. (See **117.255,** chapter 2, for drawbridge regulations.) The minimum width of the bridges is 104 feet and the clearance is 18 feet.

The **Tidal Basin** is on the northeast side of Potomac River 1.6 miles above Hains Point; tide gates obstruct the entrance.

Directly across the river from the Tidal Basin is the **Pentagon Lagoon.** Depths are about 9 feet at midchannel in the entrance and 2 to 7 feet in the lagoon. The fixed bridge over the entrance is a stone arch, 100 feet between piers, with a clearance of 18 feet over the middle 41 feet. On the north side of the lagoon just above the bridge is a marina with extensive berthing facilities; gasoline and some supplies are available. Hull and engine repairs can be made; marine railway, 30 feet. There is a 2-foot shoal just south of the marina. **Boundary Channel,** which extends northward from the lagoon between **Columbia Island** and the Virginia shore, is shallow and is crossed by several fixed bridges.

Arlington Memorial Bridge is 2.3 miles above Hains Point and 97 miles above the mouth of Potomac River. Harbor regulations prescribe a speed limit of 6 m.p.h. above the bridge.

Theodore Roosevelt Island, Mile 97.5W, is a park area. Boats should not attempt to pass between the island and the Virginia shore.

Francis Scott Key Bridge is at Mile 98.3. The stone piers of the former Aqueduct Bridge, just above Key Bridge, have been removed to a depth of 10 feet except for the one nearest the Virginia shore, which is 9 feet above water.

The commercial wharves are on the north side of Georgetown Channel at **Georgetown** between Key Bridge and **Rock Creek,** 0.6 mile downriver. The wharves, which are mostly of the bulkhead type, are privately owned. In 1980, only one wharf was active; it receives sand and gravel, and stone is shipped by barge.

Chain Bridge, Mile 101, is the head of tidewater navigation on the Potomac River.

13. CHESAPEAKE BAY, PATUXENT AND SEVERN RIVERS

This chapter describes the western shore of Chesapeake Bay from Point Lookout, on the north side of the entrance to Potomac River, to Mountain Point, the northern entrance point to Magothy River. Also described are Patuxent River, Herring Bay, West River, South River, Severn River, and Magothy River, the bay's principal tributaries; the ports of Solomons Island, Benedict, Chesapeake Beach, Shady Side, Galesville, and Annapolis; and several of the smaller ports and landings on these waterways.

COLREGS Demarcation Lines.–The lines established for Chesapeake Bay are described in **80.510**, chapter 2.

Charts 12230, 12263, 12273.–From Potomac River to Patuxent River, the western shore of Chesapeake Bay is mostly low, although the 100-foot elevation does come within 1 mile of the water midway between the two rivers. Above Patuxent River, the ground rises and 100-foot elevations are found close back of the shore along the unbroken stretch northward to Herring Bay. Above Herring Bay, the 100-foot contour is pushed back by the tributaries. Except for the developed areas, the shore is mostly wooded.

The bay channel has depths of 42 feet or more, and is well marked by lights and buoys.

The **fishtrap areas** that extend along this entire section of the western shore are marked at their outer limits and are shown on the charts.

Ice is encountered in the tributaries, particularly during severe winters. When threatened by icing conditions, certain lighted buoys may be replaced by lighted ice buoys having reduced candlepower or by unlighted buoys, and certain unlighted buoys may be discontinued. (See Light List.)

During the ice navigation season, the waters of Chesapeake Bay and it's tributaries north of Smith Point, but not including Patuxent River, are a **regulated navigation area.** (See **165.1 through 165.13, and 165.503,** chapter 2, for limits and regulations.)

Tidal Current Charts, Upper Chesapeake Bay, present a comprehensive view of the hourly speed and direction of the current northward of Cedar Point, at the south entrance to Patuxent River. The series of 12 charts may be obtained from NOS sales agents and from the National Ocean Service, Distribution Branch. (See appendix for address.)

Chart 12230.–The **danger zone** of an aerial firing range and target area begins off Point Lookout and extends northward to **Cedar Point.** (See **334.200,** chapter 2, for limits and regulations.) The target areas in the danger zone are marked by lighted buoys.

A middle ground with depths of 10 to 18 feet is about 8 miles eastward of Point Lookout; the area is about 7 miles long in a north-south direction and 2 miles wide. The stranded wreck near the middle of the shoal is marked by lighted buoys.

Chart 12233.–St. Jerome Creek, 5 miles north of Point Lookout, is entered through a channel marked by lights, daybeacons, and bush stakes. In November 1987, the reported controlling depth was 2 feet in the entrance channel leading to a basin, just westward of the entrance to Southern Prong, thence in 1982, 7 feet in the basin. The creek is used principally as an anchorage for oyster and fishing boats.

There are several small wharves along St. Jerome Creek. A landing is at **Airedele,** on the south side of the creek just above the entrance; gasoline is available. In August 1981, the dredged channel leading south from St. Jerome Creek into **Southern Prong** had a controlling depth of 4 feet. Private daybeacons mark the channel to a marina in Southern Prong. Berths with electricity, gasoline, water, ice, a launching ramp, a 40-foot marine railway, and partial hull repairs are available.

Point No Point, on the west side of Chesapeake Bay 6 miles north of Point Lookout, has no prominent natural marks. **Point No Point Light** (38°07.7′N., 76°17.4′W.), 52 feet above the water, is shown from a white octagonal brick dwelling on a brown cylinder, in depths of 22 feet, 1.6 miles southeastward of the point; a seasonal fog signal is sounded at the light. The light is 1.7 miles due west of a point on the bay ship channel 76.4 miles above the Capes.

An unmarked submerged obstruction, with a reported depth of 30 feet, is about 5.9 miles north-northwestward of Point No Point in about 38°14′09″N., 76°20′18″W.

Hooper Island Light (38°15.4′N., 76°15.0′ W.), 63 feet above the water, is shown from a white conical tower on a brown cylindrical base, in depths of 18 feet near the outer edge of the shoals, 3 miles westward from Hooper Islands; a seasonal fog signal is sounded at the light. The light is 2.8 miles due east of a point on the bay ship channel 84.4 miles above the Capes.

Chart 12264.–The enclosed naval seaplane basin 8.5 miles north-northwestward of Point No Point and 2 miles southwestward of Cedar Point has depths of about 10 feet. The entrance to the basin is between two breakwaters, each marked at their outer ends by a light.

Cedar Point (38°17.9′N., 76°22.5′W.) is 10 miles north-northwest of Point No Point. The ruins of an abandoned lighthouse are on the tiny islet 0.3 mile off the point. The shoal extending 0.5 mile eastward from the islet is marked at its outer end by a lighted buoy.

Charts 12264, 12284.–Patuxent River empties into the west side of Chesapeake Bay 89.3 miles above the Virginia Capes. Commercial traffic consists chiefly of shellfish and shells, and petroleum products. Drafts of vessels using the river are mostly 7 feet or less and seldom exceed 12 feet.

The river has natural depths of 25 to 30 feet in the approach, 30 to over 100 feet for 16 miles upstream, thence 23 feet to the Benedict highway bridge 19 miles above the mouth, thence 10 feet for 12 miles to within 2 miles of Nottingham, thence 6 feet for 5 miles, and thence 3 feet to Hills Bridge, 40 miles above the mouth. The channel is not difficult to follow as far as the Benedict bridge, and the principal shoals are marked by lights and daybeacons; the channel above the bridge is narrow in places and is marked for about another 2.5 miles.

Anchorage can be had off the mouth of Patuxent River; shelter from westerly winds is found in depths of 20 to 30 feet close to shore on the north side of the approach. Shelter from easterly winds is found in depths of 30 to 50 feet in the channel about 1.5 miles above the entrance.

Bottom in Patuxent River channel is mostly soft as far as the Benedict highway bridge, and vessels can anchor where convenient. Small vessels anchor in the creeks back of Solomons Island, but there is little swinging room. St.

Leonard Creek is a good small-vessel anchorage in any weather.

The mean range of tide is 1.2 feet at the entrance to Patuxent River, 1.6 feet at Benedict, and 2.5 feet at Nottingham. The current velocity is 0.4 knot in the entrance to Patuxent River off Drum Point. Ice closes the river to near the mouth in severe winters.

Marine supplies and complete hull and machinery repairs are available along the Patuxent River. Principal locations are in the creeks behind Solomons Island, i.e., Back Creek and Mill Creek. Facilities are also available in Town Creek, Cuckold Creek, Island Creek, and at Benedict.

Patuxent River empties into the head of the bight between Cedar Point and **Cove Point,** 5 miles to the northward. **Cove Point Light** (38°23.2′N., 76°22.9′W.), 45 feet above the water, is shown from a white tower on the point; a radiobeacon and fog signal are at the light. The light is 1 mile due west of a point on the bay ship channel 92.6 miles above the Capes. The high bluffs on **Little Cove Point,** 1.5 miles to the southward, are prominent.

The entrance to Patuxent River is between **Drum Point** and **Fishing Point,** 0.9 mile to the southward. The shoals that extend off Fishing Point and **Hog Point,** 1 mile to the east-northeastward, are marked at their outer ends by lights. A fish haven, marked by buoys, is about 1 mile east-southeastward of Light 1.

A light and seasonal fog signal are just off Drum Point.

Mileages on Patuxent River, shown as Mile 8W, 11E, etc., are the nautical miles above the midchannel point on a line drawn between Drum and Fishing Points. The letters N, S, E, and W following the numerals denote by compass points the side of the river where each feature is located.

The **Patuxent River Naval Air Station** is along the south side of the entrance. The inclosed seaplane basins, East Basin at Mile 0.8S, and West Basin at Mile 1.35S have general depths of 9 to 4 feet, and 15 to 7 feet, respectively. Lights mark the entrance points to West Basin. A **restricted area** off the air station begins about 2.4 miles south of Cedar Point and extends north to the mouth of Patuxent River, thence upstream for about 2.5 miles. (See **334.180,** chapter 2, for limits and regulations.)

Solomons Island, Mile 1.8N, is joined to the mainland on the northwest by a causeway. The shoal that extends 500 yards southward from **Sandy Point,** at the south end of the island, is marked at its outer end by a light. **Solomons,** is the village on the island and the location of the Calvert Marine Museum. The pier of the **Chesapeake Biological Laboratory** on the east side of the island has depths of 8 feet at the outer end and is marked by a private light.

Back Creek and **Mill Creek** have a common entrance between Solomons Island and the mainland 200 yards to the north-northeastward. The marked main approach, between the island and the shallow middle ground to the eastward, has depths of 20 to 25 feet. The second marked approach, between the middle ground and the mainland to the northward, has depths of 12 feet.

The two creeks separate just above the entrance. Mill Creek goes eastward of a shallow spit with a small islet at the southern end, and Back Creek goes westward; the spit and the islet are marked by lights.

There are many small-craft facilities in Back Creek, Mill Creek, and along the northern side of Solomons Island. Lifts to 50 tons and a marine railway are available for complete repairs. Complete hull and machinery services are available.

The Back Creek cove between the islet and the inner side of Solomons has general depths of 15 feet and is used as an anchorage by many yachts and fishing boats.

Back Creek has depths of 12 feet for 0.7 mile above the cove, thence 10 to 6 feet for another 0.5 mile.

Mill Creek has depths of 16 to 12 feet for 1.2 miles, thence 10 to 4 feet for another mile. Two submerged wrecks, reported covered 9 feet, are along the east side of the channel, about 0.5 mile above the mouth. Midchannel courses will safely pass the wrecks.

Town Point is at Mile 2.9S. A shoal with a daybeacon at its outer end extends about 175 yards east of Town Point. **Town Creek,** on the southwest side of the low point, is used by fishing and oyster boats, and recreational craft. The creek, marked at the entrance by a light, is entered about 0.5 mile south-southwestward of Town Point. The entrance light also marks the outer end of a shoal that extends southward from the northern entrance point. In July 1980, depths of 5 to 12 feet were reported in the creek. Submerged wrecks are reported in the southwestern arm of the creek. Several small-craft facilities are on Town Creek.

State Route 4 fixed highway bridge with a clearance of 30 feet at the west span and 35 feet at the east span crosses Town Creek about 0.3 mile above the entrance light. An overhead power cable with a reported clearance of 55 feet crosses the north arm of the creek about 0.45 mile above the entrance light.

Thomas Johnson Memorial (State Route 4) Highway Bridge, a fixed bridge with a clearance of 140 feet crosses Patuxent River between Town Point and the north shore. The area in the immediate vicinity of the bridge is subject to unpredictable and sudden changes in wind conditions. Mariners under sail should exercise caution while navigating in the area.

A sunken mooring buoy is west of the bridge about 400 yards east of the light off Point Patience.

Point Patience is at Mile 3.9N; a light marks the west side of a shoal extending southward of the point. The current is reported to be especially strong within 25 yards of the light. The long Government piers on the east and west sides of the point have depths of 20 feet or more at their outer ends. (See **334.180,** chapter 2, for limits and regulations of the **restricted area** in the vicinity of these piers.)

Cuckold Creek and **Mill Creek** (not to be confused with Mill Creek near Solomons Island) have a common entrance at Mile 4.7W. A daybeacon marks the outer end of the shoal that extends 0.4 mile southeastward from the point on the north side of the entrance, and daybeacons mark the entrance channel. The channel entrance is marked on the south side by a light. Gasoline and some supplies are available at **Clarks Wharf,** on the peninsula between the two creeks. Depths at the fuel pier are about 6 feet.

Cuckold Creek, which extends northwestward from the entrance, has depths of 15 to 11 feet for 1 mile, thence 10 to 4 feet into the several arms. Three marinas are on the south side of the creek 0.6 mile, 0.8 mile, and 0.9 mile above the entrance, respectively. Gasoline, diesel fuel, and some supplies are available. Hull and engine repairs can be made; marine railway, 60 feet; lift, 10 tons.

Hellen Creek enters Patuxent River at Mile 5.3E. In October 1981, the reported controlling depth was 6 feet across the bar at the entrance; thence in July 1980, depths of 5 feet were reported available for 1 mile into the creek; the deeper water favors the east side of the entrance. The creek is used principally as a small-boat harbor.

St. Leonard Creek, Mile 7E, has depths of 15 to 10 feet for 2 miles, then shoals gradually to 1 foot at the head, 3.5 miles above the entrance. Safe anchorage in any weather is available in depths of 15 to 21 feet, 0.5 mile above the entrance. An overhead power cable with a reported clearance of 50 feet crosses the creek about 3.4 miles above the

mouth. Gasoline and diesel fuel are available at a marina on the east side, 2 miles above the mouth. The shoal that extends 0.4 mile southward from **Petersons Point,** on the northwest side of the entrance, is marked at its outer end.

A **148°-328°** measured course, 1,000 yards long, is 0.5 mile westward of Petersons Point. The course is marked by privately maintained seasonal marker buoys.

Brooms Island, which is not an island but a mainland peninsula, is at Mile 9.5N. A light marks the limit of the shoal area that extends 0.2 mile southward of the peninsula.

Island Creek, which empties into Patuxent River along the east side of Broomes Island, has depths of 8 to 10 feet for 1 mile, but there are unmarked shoals, particularly along the west side of the entrance; a light marks the east side of the entrance.

The village of **Broomes Island** is on the west side of Island Creek about 1 mile from the outer end of the peninsula. Gasoline and some supplies are available at the crab and oyster piers.

Nan Cove, on the west side of Broomes Island, is entered by a marked dredged channel which leads to a turning basin in the upper end of the east arm. In April 1983, the controlling depth was 4½ feet.

A private channel, marked at the entrance by a private light, leads to a marina at the entrance to **Cat Creek** at Mile 12.6W. In 1980, the channel had a reported controlling depth of 3 feet. Gasoline, diesel fuel, some supplies, berths, a sewage pump-out station, and a 10-ton lift are available. Minor repairs can be made.

Battle Creek, Mile 13.2E, has depths of 10 to 7 feet for 1.5 miles. Private daybeacons mark the channel through the shoals just above the entrance. A shoal which extends 0.3 mile southwestward from the point on the east side of the entrance is marked at its outer end by a light.

The highway bridge over Patuxent River at Mile 18.8, from **Town Point** on the west side to **Hallowing Point** on the east side, has a 49-foot swing span with a clearance of 16 feet. (See **117.1 through 117.59 and 117.567,** chapter 2, for drawbridge regulations.)

Benedict, a village just below the west end of the highway bridge, is the head of commercial navigation on Patuxent River. A marina at the south end of Benedict can provide gasoline, berths, and some supplies. Minor repairs can be made; marine railway, 32 feet.

Navigation on Patuxent River above Benedict is difficult because of the numerous fishtraps and stakes.

Overhead power cables with a clearance of 60 feet over the main channel cross Patuxent River at Mile 20.9. The supporting towers are marked by private lights.

An overhead power cable across Patuxent River at Mile 25.5, a mile above **Holland Cliff,** has a clearance of 46 feet.

Lower Marlboro is a village at Mile 28.3E. The State landing has depths of 12 feet at the face.

Nottingham, a village at Mile 32.8W, has a landing with depths of 13 feet at the face. In 1980, a draft of 5 feet could be carried with local knowledge to the Maryland Route 4 fixed highway bridge at Upper Marlboro, about 10 miles above Nottingham.

On the west side of Chesapeake Bay north of Cove Point is a liquefied natural gas unloading terminal of the Columbia LNG Corp. The offshore unloading platform, 2,470 feet long with dolphins, has reported depths of 40 feet alongside. The platform has a deck height of 40 feet and provides berthing space for two LNG tank vessels. The platform, marked by private lights, is connected to shoreside facilities by a submerged tunnel. A **safety zone** is in the vicinity of the LNG terminal. (See **165.1 through 165.7, 165.20 through 165.25, and 165.502,** chapter 2, for limits and regulations.)

Flag Harbor, on the west side of Chesapeake Bay 6.3 miles northwest of Cove Point, has depths of about 3½ feet in the entrance channel leading to a small-boat basin. The 600-foot stone jetties on either side of the entrance are almost covered at high water.

Chart 12266.–Plum Point Creek (38°36.9′N., 76°30.7′W.) empties into the west side of Chesapeake Bay 15 miles north-northwest of Cove Point. In 1982, depths of 4½ feet were reported in the entrance to the creek and in the small-boat basin. A marina on the north side of the creek can provide some berths, gasoline, some supplies, and a sewage pump-out station.

Overhead telephone and power cables with a clearance of 42 feet cross the creek 0.1 mile above the mouth.

The **danger zone** of the **Naval Research Laboratory** firing range fans out from a point near **Randle Cliff Beach** (38°38.5′N., 76°31.7′W.), 18 miles northward of Cove Point. (See **334.170,** chapter 2, for limits and regulations.) The laboratory towers are prominent.

Chesapeake Beach (38°41.8′N., 76°32.0′W.) is a resort and fishing center on the western shore of Chesapeake Bay 19.6 miles northward of Cove Point. **Fishing Creek,** on the north side of the resort, is entered by a dredged channel which leads from the bay through jetties to an anchorage basin in the creek. The channel is marked by a lighted range and other aids. In May 1983, the controlling depth in the channel was 6 feet (7 feet at midchannel); thence depths of 5 to 7 feet were in the basin. The fixed highway bridge 0.3 mile above the jetties has a width of 36 feet and a clearance of 10 feet.

Small-craft facilities, on the south side of the creek at Chesapeake Beach, have gasoline, diesel fuel, water, berths, and marine supplies. Hull and engine repairs can be made; marine railway, 50 feet; lift, 12 tons.

Chart 12270.–Holland Point (38°43.6′N., 76°31.7′W.), on the western shore of Chesapeake Bay 21.6 miles above Cove Point, has shoal areas extending in all directions; depths of 11 feet are 1.3 miles to the eastward and northeastward. Buoys mark the outer edges of the shoals. A fish haven, marked by buoys, is about 2.2 miles east-northeast of Holland Point.

Herring Bay, between Holland Point and the marsh 3 miles to the northward, has general depths of 14 to 7 feet. **Long Bar,** with depths of 2 to 5 feet, extends from the north side of the bay to within 1 mile of Holland Point, and is marked at its south end by a light. The mean range of tide is 0.9 foot.

Herrington Harbour (see also chart 12266), 0.6 mile westward of Holland Point, is entered through a jettied private channel from the south side of Herring Bay. The channel is marked by a **199°** lighted range and other private aids. In July 1980, the channel had a reported controlling depth of 6 feet. The channel is very narrow and must be followed closely to carry the best water. A small-craft facility is on the east side of the harbor just inside the entrance. Gasoline, diesel fuel, water, and berths are available.

Rockhold Creek, at the northwest corner of Herring Bay, has good shelter for small boats. A marked dredged channel leads from the bay to near the county wharf and a turning basin just below the fixed highway bridge at **Deale.** In December 1981, the midchannel controlling depth was 6½ feet to the county wharf, thence in 1978, depths of 2½ to 5 feet were in the turning basin. In 1978, a submerged

ROCKHOLD CREEK, MARYLAND
Fixed Highway Bridge
Highway Bridge
Rockhold Creek
Herring Bay
N
1976

obstruction was reported along the east side of the channel 20 yards north of Daybeacon 3. Depths are 3 to 5 feet for about 0.4 mile above the bridge. A light marks the outer end of the breakwater on the north side of the entrance. The fixed highway bridge 1 mile above the entrance has a width of 47 feet and a clearance of 14 feet. The fixed highway bridge 1.8 miles above the entrance has an opening 41 feet wide with a clearance of 10 feet.

A 6 m.p.h. **speed limit** is enforced in Rockhold Creek.

There are extensive small-craft facilities on both sides of Rockhold Creek below the first bridge, and on the east side of the creek between the first and second bridges.

West River, 8.5 miles above Holland Point, empties into the west side of Chesapeake Bay north of **Curtis Point** (38°51.1′N., 76°29.9′W.). A marked fish trap area is off the entrance. The river has depths of 14 to 7 feet for about 4 miles, then shoals gradually to less than 3 feet in the tributaries. The river channel is marked by a light at the entrance, and by lights, daybeacons, and a buoy to **Galesville,** on the west side of the river 2.5 miles above the entrance light. A yacht club is on the east side of the river at **Avalon Shores,** opposite Galesville.

In July 1986, an unmarked partially submerged steel structure was reported about 150 yards east of Light 4 in about 39°51′19″N., 76°31′50″W.

Several small-craft facilities are at Galesville and closeby.

Parish Creek, on the south side of West River 0.5 mile westward of Curtis Point, is entered by a marked dredged channel which leads to an anchorage basin, and thence to **Shady Side** at the head of the south fork. In August 1985, the reported centerline controlling depths were 2 feet to the anchorage basin, thence 4 feet in the channel in the south fork. In 1981, depths of 3½ to 5½ feet were in the basin. A 6 m.p.h. **speed limit** is enforced.

Small-craft facilities on the north side of Parish Creek and at Shady Side can provide gasoline, water, berths, and marine supplies. Hull and engine repairs can be made. Largest haul-out capacities: marine railway, 35 feet; lift, 20 tons.

Rhode River empties into the north side of West River 1.1 miles westward of West River Entrance Light 2. The river, marked at the entrance by a light, has depths of 11 to 9 feet for 2 miles. The critical shoals extending off the points are marked.

Cadle Creek, on the east side of Rhode River 1 mile above the entrance light, has depths of 4 to 7 feet. The entrance to the creek is marked by daybeacons. **Mayo** is a town on the east side of the creek.

Bear Neck Creek, on the north side of Rhode River 1.5 miles above the entrance light, has depths of 9 to 5 feet for 1 mile. The entrance is marked by daybeacons.

Small-craft facilities are on Cadle Creek and Bear Neck Creek.

An **000°–180° measured course,** 0.5 mile long, is about 1.4 miles eastward of Curtis Point. The course is marked at each end by an orange and white mine-type buoy. These private aids are maintained from May to November.

South River, just north of West River, has channel depths of 14 feet or more to the second bridge, 6 miles above the mouth, then shoals gradually to 2 feet at the bridge near the head, 8.5 miles above the mouth. The river channel is marked to a point about 0.3 mile below the second bridge. Several of the creeks that flow into the river have good depths and are used extensively by local yachts and motorboats. Although there are no commercial facilities in the creeks on the north side below the first bridge, most of these tributaries are reported to provide good anchorage.

The entrance to South River is between **Saunders Point** and **Thomas Point,** 1.8 miles to the northeastward. **Thomas Point Shoal Light** (38°53.9′ N., 76°26.2′ W.), 43 feet above the water, is shown from a white hexagonal tower on piles, in depths of 5 feet near the outer end of the shoal 1.2 miles east-southeastward of the point; a fog signal is at the light; special radio direction-finder calibration service is provided. (See Light List.) The light is 1.5 miles due west of a point on the bay ship channel 124.2 miles above the Capes.

Selby Bay, on the southwest side of South River 1.7 miles above the mouth, has general depths of 8 to 11 feet. The south end of the bay is shallow. The channel to **Selby Beach,** on the northwest side of the bay, is marked by lights and a daybeacon. **Ramsay Lake** has a narrow entrance from the south end of Selby Bay; depths are about 2 feet in the entrance and 7 to 8 feet in the lake. The fixed highway bridge over the Selby Bay entrance to the lake has a width of 20 feet and a clearance of 10 feet.

Small-craft facilities are on the south and west sides of Selby Bay and in Ramsey Lake.

Brewer Creek, on the southwest side of South River 3 miles above the mouth, has depths of 12 feet in the entrance, and 4½ feet reported through the narrows 0.2 mile above the entrance. The narrows connect Brewer Creek with **Pocahontas Creek** to the southward. Gasoline, water, berths, and limited marine supplies are available in Pocahontas Creek; hull and engine repairs can be made.

Glebe Bay, on the southwest side of South River 3.5 miles above the mouth, has general depths of 13 to 15 feet. Care should be taken to avoid the 2-foot shoal near midbay and the 2-foot shoals along the northwest and southeast sides of the bay. **Glebe Creek,** with depths of 11 to 7 feet for about 0.4 mile, empties into the southwest side of the bay. Gasoline, water, and berths are available in the cove on the north side of the bay just inside the entrance.

State Route 2 fixed highway bridge at **Egewater,** 5 miles above the mouth of South River has a clearance of 53 feet.

Gingerville Creek, on the north side of South River, extends along the westerly side of Edgewater. The creek has depths of 6 feet for 0.7 mile, nearly to the head.

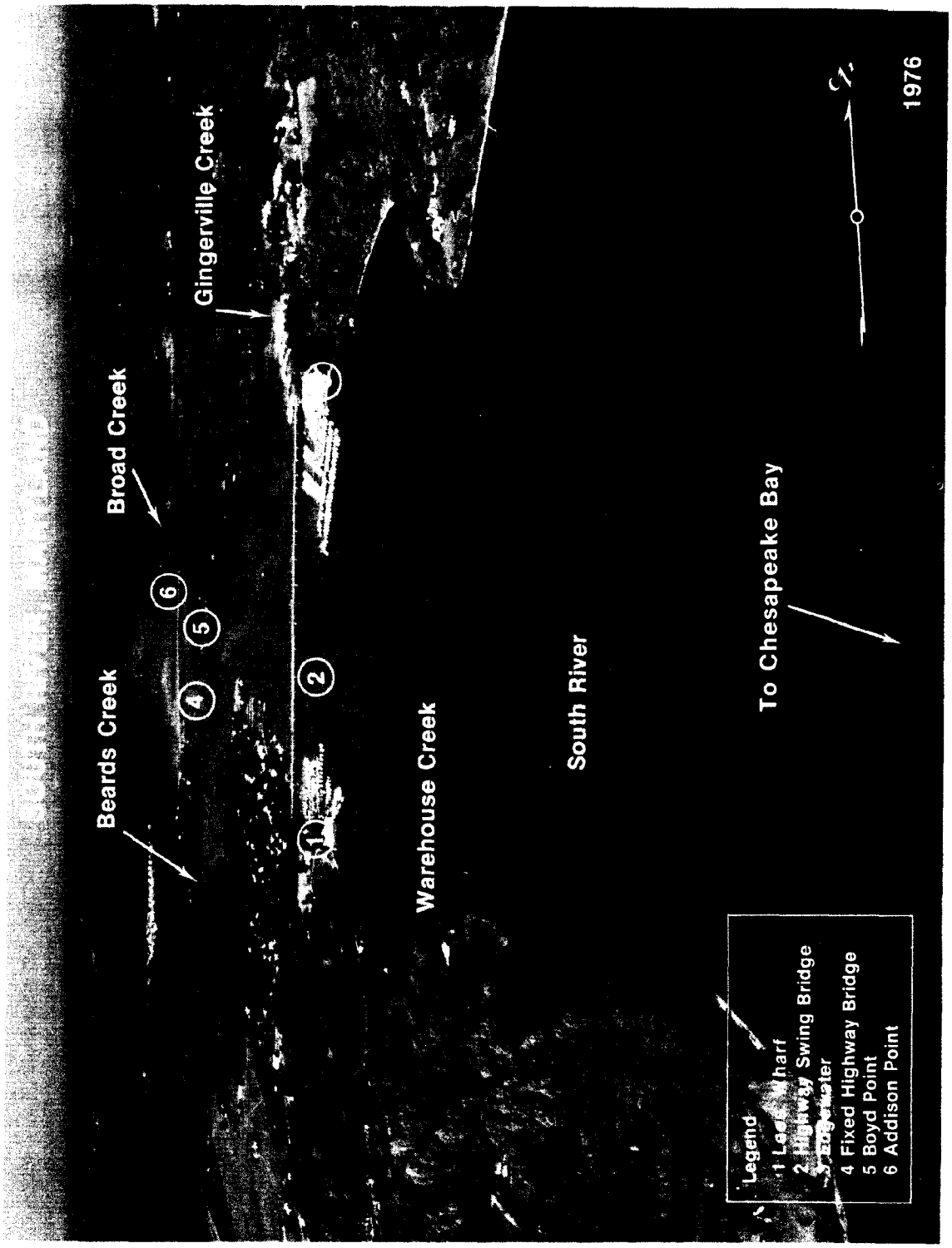
There are small-craft facilities at Edgewater, and in Warehouse Creek, on the south side of the river opposite Edgewater. (See the small-craft facilities tabulation on chart 12271 for services and supplies available.)

Beards Creek, on the south side of South River 5.7 miles above the mouth, has depths of 15 to 8 feet for 1 mile; a shallow spit extends halfway across the entrance from the point on the northwest side. In October 1978, a submerged piling was reported in Beards Creek in about 38°56.6′N., 76°34.6′W. The highway bridge at **Riva,** 6 miles above the mouth of South River, has a fixed span with a clearance of 25 feet. Water, berths, and some marine supplies are available at Riva. Hull and engine repairs can be made; marine railway, 40 feet.

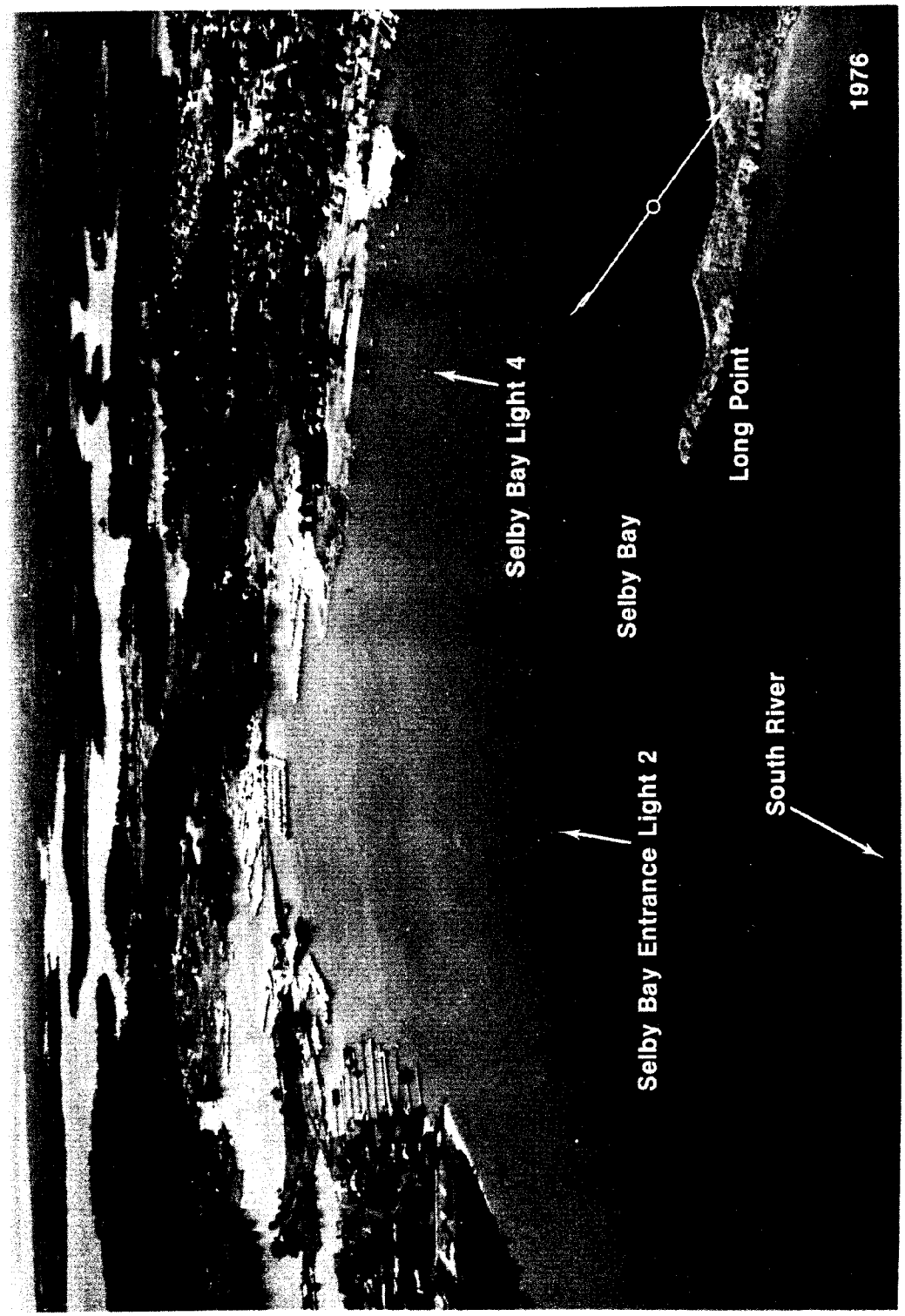
Fishing Creek, immediately northward of the entrance to South River, has depths of 7 to 4 feet. A privately dredged channel leads from Chesapeake Bay to the **Annapolis Coast Guard Station** wharf on the northwest side of the creek. In July 1980, the marked channel had a reported controlling depth of 5 feet.

Chart 12282.–Severn River, the approach to Annapolis, empties into Chesapeake Bay 127 miles above the Virginia Capes. Commercial traffic consists chiefly of petroleum products, and some fish and shellfish. Naval craft and many pleasure craft use the river.

The river has main channel depths of 17 feet or more from the entrance to Annapolis, thence 15 feet or more for 8 miles, thence 11 to 7 feet for 2 miles to within 1 mile of the


Beards Creek
Broad Creek
Gingerville Creek
Warehouse Creek
South River
To Chesapeake Bay
1976
Legend
1 Leg Wharf
2 Highway Swing Bridge
3 Breakwater
4 Fixed Highway Bridge
5 Boyd Point
6 Addison Point

SELBY BAY, MARYLAND



head. The channel is well marked as far as Annapolis, above which it is marked at the critical points and is easy to follow.

The mean range of tide is 0.9 foot, and is greatly influenced by winds. The current velocity seldom exceeds 0.5 knot. Ice rarely interferes with navigation except in severe winters, and then only for a short time.

Chart 12283.–The entrance to Severn River is between **Tolly Point** and Greenbury Point, 2 miles to the northward. **Tolly Point Shoal,** with depths of 4 to 5 feet, extends 1 mile east-southeastward from the point; it is marked at its outer end by a lighted buoy.

A sunken wreck in 20 feet of water is in the entrance channel, about 150 yards northwestward of Severn River Channel Lighted Bell Buoy 2.

The entrance to **Lake Ogleton** is on the southwest side of Severn River 0.8 mile above Tolly Point. The lake has depths of 5 to 9 feet, but the narrow entrance, marked by lights and daybeacons, in July 1979, had a reported centerline controlling depth of 6 feet. The small private wharves along the shore of the lake are used mostly for mooring pleasure craft.

Greenbury Point is on the north side of the entrance to Severn River. The tall towers of the naval radio station on the point are prominent from up and down the bay; each tower has a flashing red light on top and fixed red lights on the sides. Most prominent is the lighted 1,217-foot-high radio tower, about 0.7 miles northward of Greenbury Point. A light and seasonal fog signal mark the shoal extending 0.4 mile south of the point. A 3-foot depth at the outer tip of the shoal is 250 yards westward of the light and only 100 yards northeastward of the buoyed entrance channel.

A **naval deep-draft anchorage** is southeast of Greenbury Point, and several smaller **naval anchorages** and **prohibited anchorages** are west and northwest of the point. (See **110.1 and 110.159,** chapter 2, for limits and regulations.)

The entrance to **Carr Creek** is northwest of Greenbury Point. The creek has depths of 9 feet over the unmarked entrance bar and deeper water through a narrow channel inside. A naval rifle range is on the west side of the entrance to the creek. Mariners are warned to keep out of the creek when the red flag is flying from **Carr Point** or the next point southward.

A detached breakwater is about 50 yards south of a pier that extends southeastward from the point south of Carr Point; another detached breakwater is about 125 yards southeastward of the same pier.

Back Creek, on the southwest side of Severn River 0.7 mile above the mouth, has depths of 7 to 9 feet for most of its 1-mile length. A light marks the outer end of the breakwater on the south side of the entrance, and lights and daybeacons mark the narrow entrance channel. In April 1980, shoaling to 3 feet was reported on the north side of the entrance in about 38°58.1′N., 76°28.3′W. The creek is used by fishing boats and pleasure craft. Most of the berthing and repair facilities are at **Eastport** along the north side of the creek.

Spa Creek, on the southwest side of Severn River 1.4 miles above the mouth, has depths of 13 feet in the entrance channel, thence 10 feet to the highway bridge, and thence 10 to 6 feet for 0.7 mile to near the head. Drafts of vessels using the creek are mostly 10 feet or less. The State Route 181 highway bridge from Eastport to Annapolis, 0.4 mile above the entrance, has a 40-foot bascule span with a clearance of 15 feet. The bridgetender monitors VHF-FM channel 16 (156.80 MHz) and works on channels 13, and 68; call sign, KZA-871. (See **117.1 through 117.59 and 117.571,** chapter 2, for drawbridge regulations.)

Annapolis, the capital of Maryland, is on the north side of Spa Creek. The **U.S. Naval Academy** occupies the entire northeastern part of the city between Spa Creek and College Creek, 0.7 mile to the northwestward.

Storm warning signals are displayed. (See chart.)

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Annapolis is a **customs port of entry.**

Harbor Regulations.–The **harbormaster** has an office on the north side of Market Slip and enforces city regulations for the harbor. A **speed limit** of 6 m.p.h. is enforced.

The Naval Academy **Santee Basin,** on the Severn River side of Annapolis, has reported depths of 15 feet. The basin is within a **restricted area.** (See **334.160,** chapter 2, for limits and regulations.)

Spa Creek waterfront has depths of 4 to 10 feet reported alongside the bulkhead and wharves almost to **Market Slip,** 250 yards below the north end of the Spa Creek highway bridge. Market Slip is 250 yards long and 40 yards wide, with depths of 8 to 10 feet; the slip is open to the public and is used extensively by small craft.

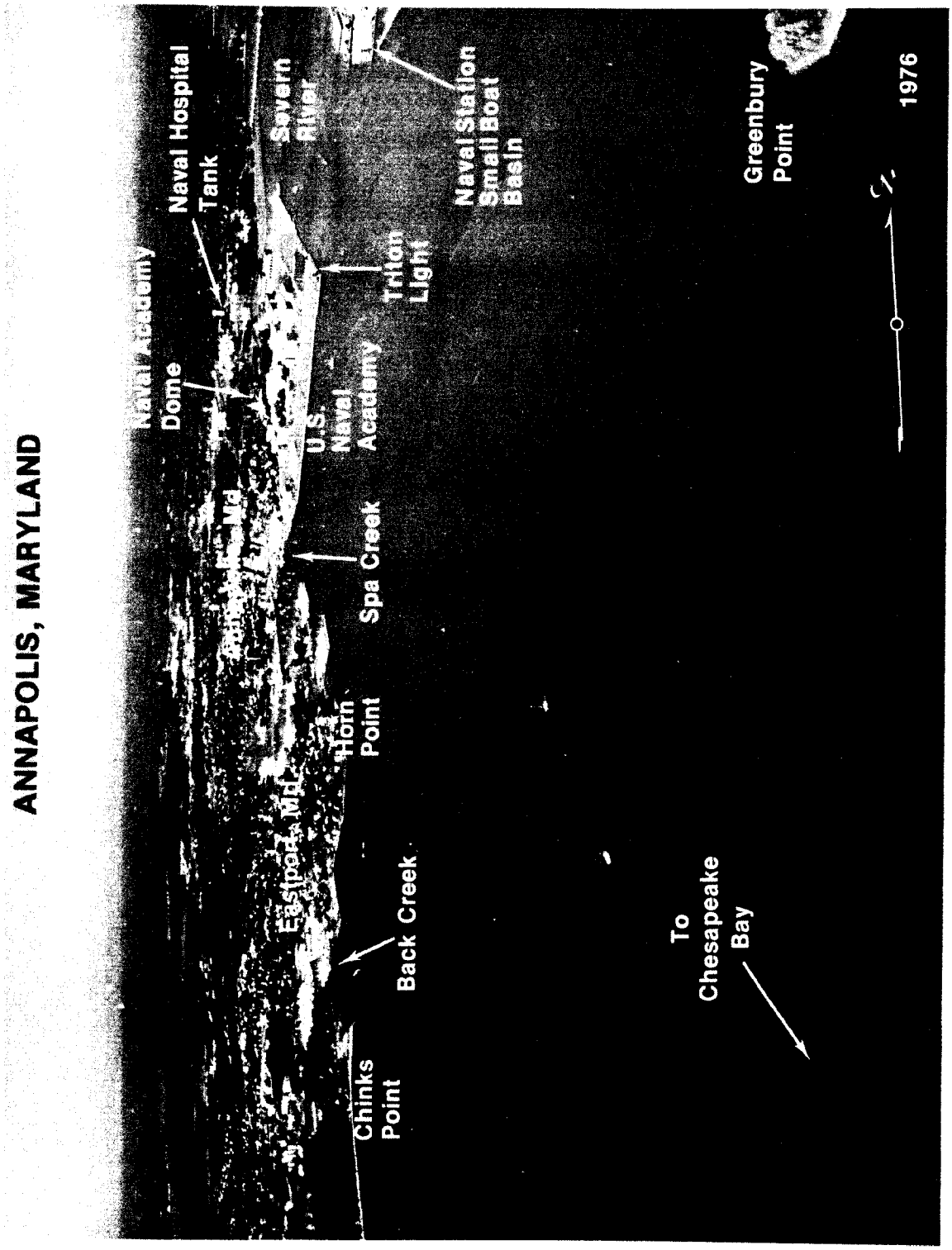
Extensive marine facilities are on both sides of Spa Creek above and below the bridge. Most of the boatyards are on the south, or Eastport, side of Spa Creek.

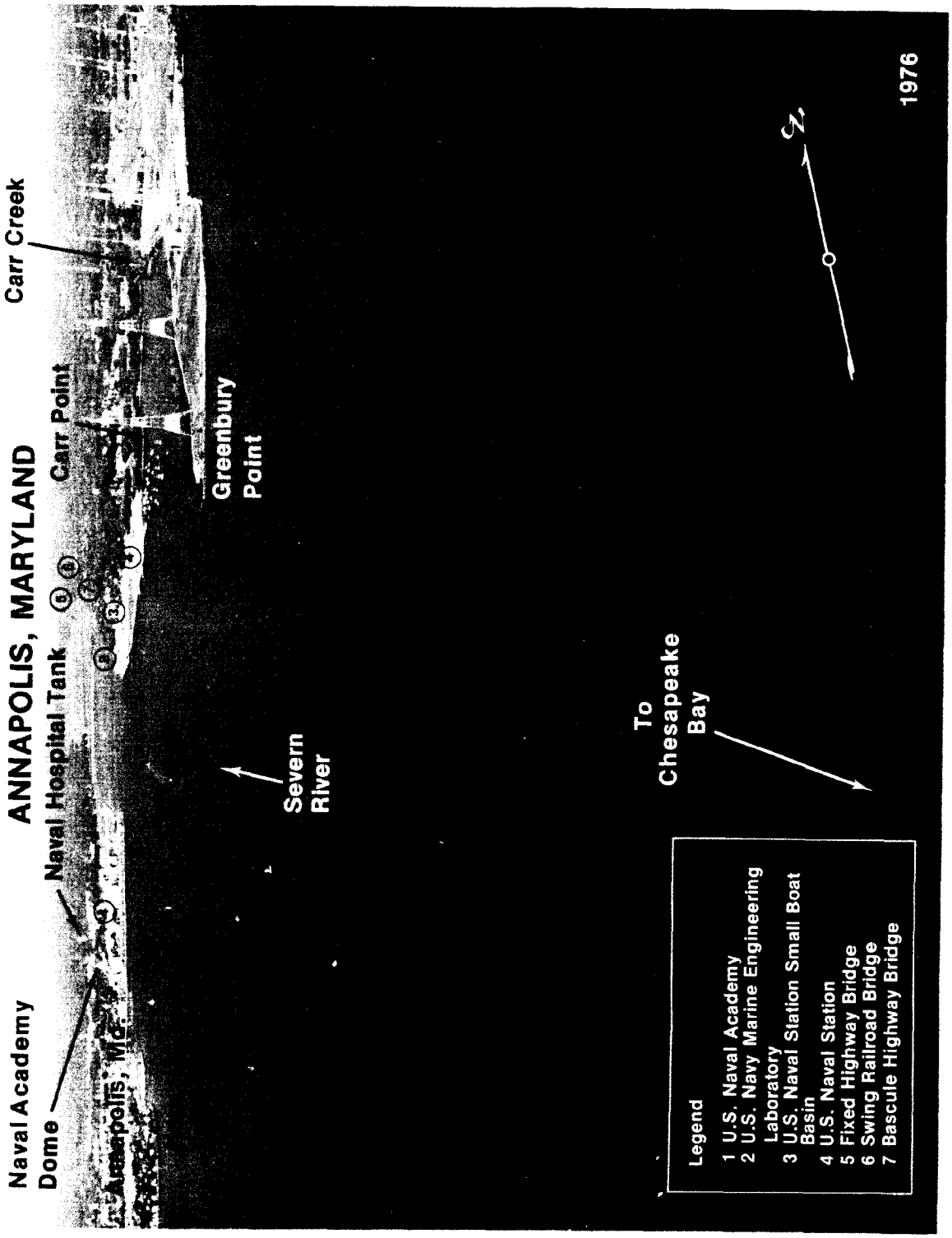
The **U.S. Navy Marine Engineering Laboratory** is part of the Government reservation extending from Carr Creek along the eastern shore of Severn River for about 1 mile to **Ferry Point.** The small-boat basin, 0.4 mile westward of Carr Creek, can be entered only in an emergency. (See **334.150,** chapter 2, for limits and regulations of the **restricted area** extending off the piers north of the basin.)

College (Dorseys) Creek, on the southwest side of Severn River 2.1 miles above the mouth, has depths of 11 to 8 feet for most of its 1-mile length; the best water in the entrance is along the south side. A fixed footbridge, two drawbridges, one fixed bridge, and an overhead pipeline cross the creek from Annapolis on the southeast bank to **West Annapolis** on the northwest bank. The drawspans are secured in a fixed position. (See **117.555,** chapter 2, for drawbridge regulations.) The bridges and overhead pipeline have a minimum width of 40 feet and clearance of 5 feet.

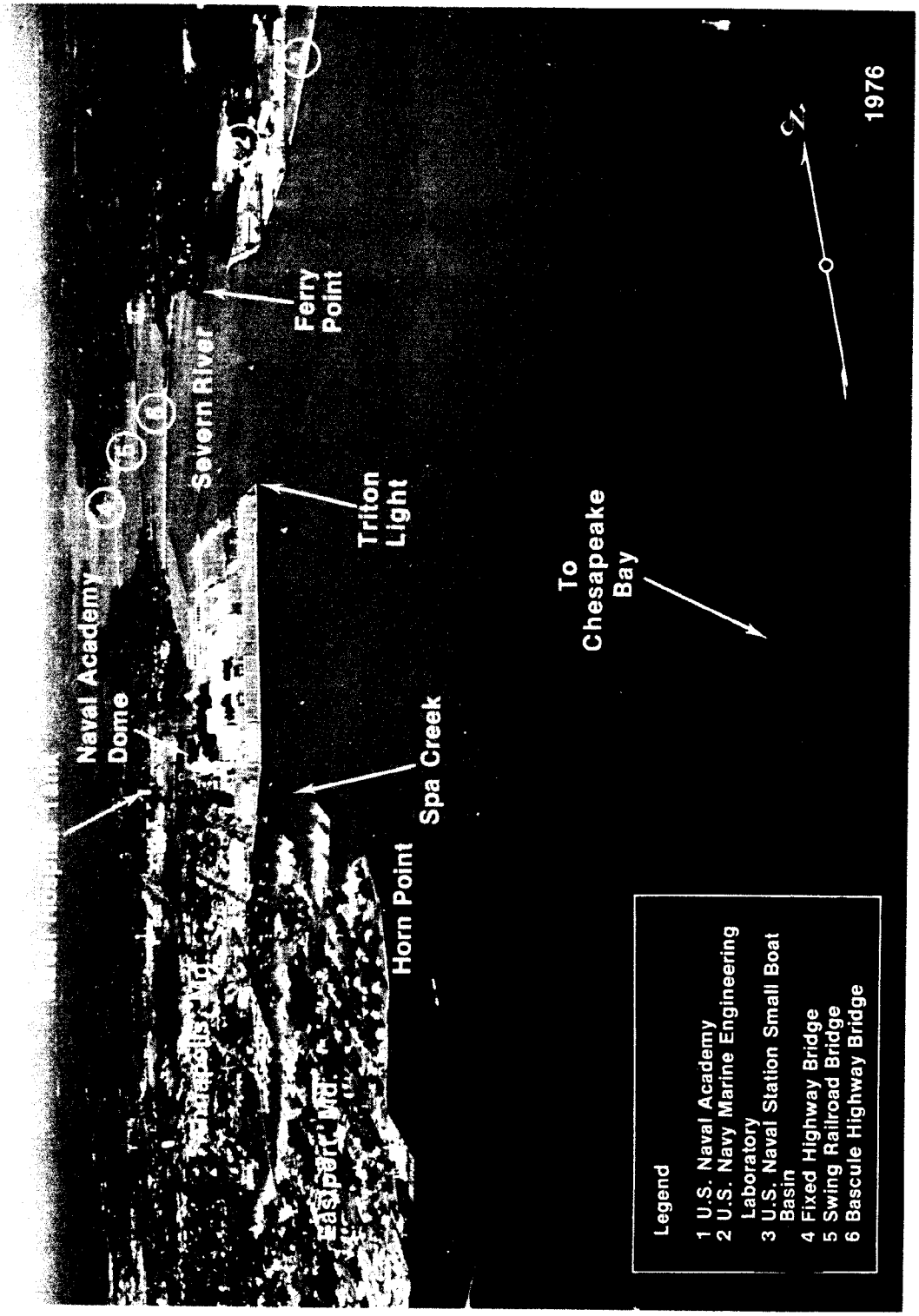
The highway bridge, 2.4 miles above the mouth of Severn River, has a bascule span with a clearance of 12 feet. The The bridgetender monitors VHF-FM channel 16 and works on channels 13, and 68; call sign KQA-872. The railroad bridge 3 miles above the mouth has a swing span with a clearance of 6 feet. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) The swing span and the northern section of the railroad bridge 3 miles above the mouth has been removed.

Chart 12282.–Weems Creek (39°00.0′N., 76°30.1′W.), on the southwest side of Severn River 3.2 miles above the mouth, has depths of 13 feet for 0.8 mile, thence 11 to 7 feet for 0.3 mile to near the head. A shoal extends 300 yards eastward from the point on the north side of the entrance, and is marked by a buoy. The highway bridge 0.5 mile above the entrance has a swing span with a width of 28 feet and a clearance of 5 feet. (See **117.1 through 117.59 and 117.577,** chapter 2, for drawbridge regulations.) The fixed highway bridge about 500 feet above the drawbridge has a


ANNAPOLIS, MARYLAND
Naval Academy
Dome
Naval Hospital
Tank
Severn
River
Naval Station
Small Boat
Basin
Triton
Light
U.S.
Naval
Academy
Spa Creek
Horn
Point
Eastport, Md.
Back Creek
Chinks
Point
To
Chesapeake
Bay
Greenbury
Point
1976


ANNAPOLIS, MARYLAND
Naval Academy Dome
Naval Hospital Tank
Carr Point
Carr Creek
Greenbury Point
Severn River
To Chesapeake Bay
Legend
1 U.S. Naval Academy
2 U.S. Navy Marine Engineering Laboratory
3 U.S. Naval Station Small Boat Basin
4 U.S. Naval Station
5 Fixed Highway Bridge
6 Swing Railroad Bridge
7 Bascule Highway Bridge
N
1976

ANNAPOLIS, MARYLAND



clearance of 28 feet. A private special purpose buoy at the mouth of Weems Creek marks a **speed** controlled area.

U.S. Route 50/301 fixed highway bridge over Severn River, 3.5 miles above the mouth, has a clearance of 80 feet at the center span.

Round Bay, an expansion of Severn River beginning 6 miles above the mouth and continuing for 2 miles, has depths of 17 to 23 feet and is traveled extensively by motorboats. **Little Round Bay,** west of Round Bay, has depths of 17 to 19 feet, and is marked by daybeacons. Depths of 4 feet can be carried to a boatyard in **Browns Cove,** behind **St. Helena Island.** Gasoline and some supplies can be obtained. Repairs are made; lift, 30 tons.

Forked Creek, on the north side of Severn River 9 miles above the mouth, has depths of 16 to 10 feet for most of its 0.4-mile length. The marine service pier in the creek has depths of 8 feet at the outer end; gasoline, diesel fuel, and some supplies are available. A yacht yard has berths and does repair work on small craft; marine railway, 50 feet.

There is a small-boat basin on the east side of Severn River, 11 miles above the mouth. The controlling depth to the basin is about 3 feet.

Charts 12283, 12282.–Whitehall Bay, on the west side of Chesapeake Bay, is between Greenbury Point (38°58.5′N., 76°27.3′W.) and **Hackett Point,** 1.5 miles to the northeastward. The bay has general depths of 13 to 6 feet. The entrance channel is about 300 yards wide between **Whitehall Flats** on the west and **North Shoal** on the east, both with depths of 3 to 4 feet; a light marks the western limit of North Shoal.

Mill Creek, which empties into the northwest corner of Whitehall Bay, is entered through a privately dredged entrance channel marked by a light and daybeacons; in 1971, the controlling depth was 7 feet. The depths above the dredged channel are 7 to 14 feet for 1.5 miles to near the head of the creek. Gasoline is available at a pier 0.7 mile above the entrance. A marine railway, 1.3 miles above the entrance, can handle boats up to 40 feet. Gasoline and water are available just west of the railway.

Whitehall Creek, which empties into the northeast corner of Whitehall Bay, has depths of 9 to 13 feet for 1.5 miles, then shoals gradually to 1-foot at the head 0.5 mile farther up. The narrow, crooked entrance channel is marked by daybeacons. In 1978, shoaling to 6 feet was reported in the channel between buoys 4 and 5. A 40-foot marine railway and a 5-ton lift are available at the entrance to a cove on the west side, 0.9 mile above the mouth. The marine service pier on the northeast side of Whitehall Creek, 1.4 miles above the entrance, has depths of 10 feet at the outer end; gasoline, diesel fuel, and some supplies are available. A 50-ton mobile lift is at the pier; repairs can be made.

Meredith Creek, in the northeast corner of Whitehall Bay just eastward of Whitehall Creek, has depths of about 2 feet in a very narrow entrance, thence 10 to 7 feet for 0.7 mile, then shoals gradually to 1 foot at the head, 0.6 mile farther up. Local knowledge is necessary to carry more than 2 feet through the entrance.

A fish haven, marked by a buoy, is about 1 mile eastward of Hackett Point.

The two spans of the **William P. Lane, Jr. Memorial (Chesapeake Bay Bridge) Bridge (U.S. Route 50/301)** (see also charts 12270, 12263), 130 miles above the Virgina Capes, are 3.7 miles long from shore to shore; the western end is 0.5 mile southwestward of Sandy Point, and the eastern, or Kent Island end, is 4 miles south-southwestward of Love Point.

The suspension spans over the main channel 1.4 miles from the western end of the bridge have a least width of 1,500 feet and a least clearance of 186 feet. Flashing red aerolights are mounted on top of the two suspension towers. Three fixed white lights are mounted vertically at the center of the main channel spans over fixed green range lights. Fog signals are mounted on the south and north sides of the bridge at the center of the main channel spans. A racon is at the center of the south span.

The fixed spans over the secondary channel 1.2 miles from the eastern end of the bridge have a least width of 690 feet and a clearance of 58 feet. The center of the spans are marked by a range of two green lights. A fog signal is at the span center.

Red lights mark the ends of the bridge piers, except those adjacent to the main channel, between points 0.3 mile from the western end and 1 mile from the eastern end. Lighted buoys mark the main channel on either side of the bridge. The abandoned Sandy Point-Matapeake Ferry Terminal is just south of the west end of the bridge.

Sandy Point State Park is just north of the west end of the bridges. In 1983, the reported controlling depth was 3 feet in the State-maintained entrance channel and basin at **Mezick Ponds.** The channel and basin are privately marked by lights and daybeacons. A slow no-wake sign is posted at the entrance. Gasoline and some supplies are available; overnight mooring is prohibited except in emergency.

Sandy Point Shoal Light (39°01.0′ N., 76°23.1′ W.), 51 feet above the water, is shown from a red brick house with white roof, on a brown cylindrical pier in depths of 9 feet 0.4 mile northeastward of Sandy Point. A seasonal fog signal is sounded at the light. The light is 0.5 mile due west of a point on the bay ship channel 131.5 miles above the Capes.

Storm warning signals are displayed. (See chart.)

Baltimore Light (39°03.5′N., 76°24.0′W.), 52 feet above the water, is shown from a white, octagonal house on a brown cylindrical pier, in depths of 22 feet, 2.5 miles north of Sandy Point.

Magothy River (see also chart 12278), on the west side of Chesapeake Bay 1.7 miles westward of Baltimore Light, has depths of 10 feet or more for 6 miles, thence 4 feet for 0.5 mile to within 0.2 mile of a fixed highway bridge. There are many excellent anchorages in the numerous tributaries, and the area is a favorite cruising ground for pleasure craft. The critical points along the lower half of the channel in Magothy River are marked.

The entrance to Magothy River is between **Persimmon Point** and Mountain Point, 0.4 mile to the north-northeastward. **Mountain Point,** the southernmost extremity of **Gibson Island,** is a sandy spit making out from a high wooded bluff. The current velocity is 0.6 knot on the flood and 0.3 knot on the ebb in the entrance to Magothy River.

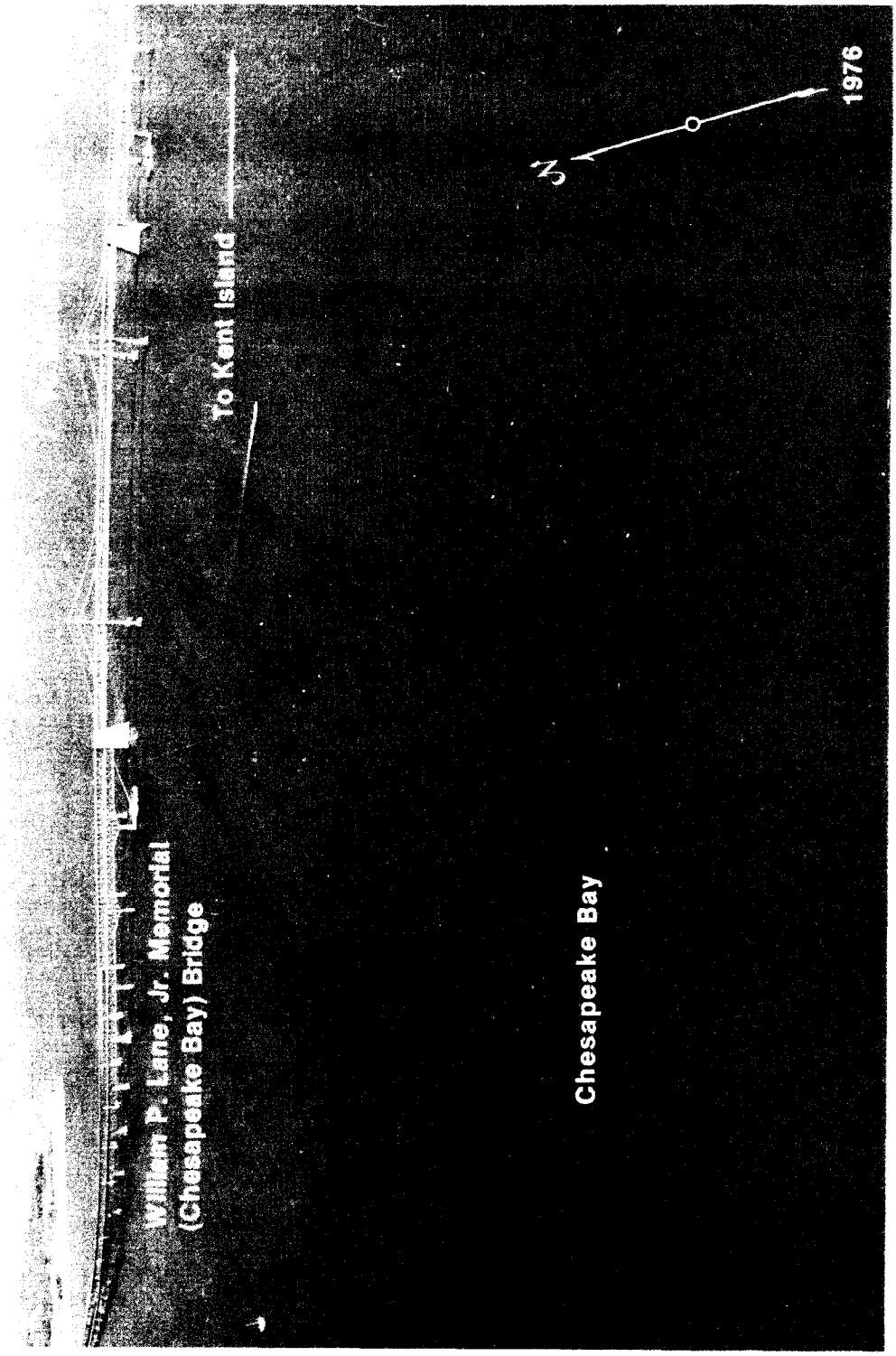
Deep Creek, marked through the entrance, is on the south side of Magothy River 0.5 mile above the mouth. The creek has depths of 7 to 5 feet for 0.6 mile to near the head. Gasoline, water, berths, and some marine supplies are available at marinas in the creek. Hull and engine repairs can be made; lift, 10 tons.

A 6 m.p.h. **speed limit** is enforced in Deep Creek.

Sillery Bay, on the north side of Magothy River along the west side of Gibson Island, has general depths of 8 to 13 feet. The bay is the approach to Magothy Narrows and the harbor on the north side of Gibson Island; the eastern shore of the island is connected with the mainland on the north by a causeway.

The marked channel through **Magothy Narrows** has depths of about 10 feet, and there are depths of 9 to 10 feet in Inner Harbor. The Gibson Island Yacht Club has facilities in Inner Harbor.

CHESAPEAKE BAY–VICINITY OF SANDY POINT AND KENT ISLAND, MARYLAND



A marine service pier on the east side of the entrance to **Redhouse Cove,** at the west end of Inner Harbor, has reported depths of 7 feet at the outer end. The boatyard can haul out craft up to 50 feet for repairs.

Cornfield Creek, which flows into the eastern end of Magothy Narrows, has depths of 7 feet nearly to its head. Gasoline, diesel fuel, water, berths, and some marine supplies are available just above the mouth.

Grays Creek, in the northwest side of Sillery Bay, has depths of about 3 feet over the entrance bar through a narrow marked channel which leads to deeper water inside the creek. A boatyard just inside the north prong has gasoline, water, and some marine supplies. Hull and engine repairs can be made; marine railway, 35 feet.

Broad Creek, marked by daybeacons off the entrance, is on the north side of Magothy River 2.5 miles above the mouth. The creek has depths of 9 feet or more to a marine in the upper end of the creek.

Blackhole Creek, on the north side of Magothy River 3.5 miles above the mouth, has depths of 7 feet in a narrow marked entrance channel, and 5 or more feet almost to the head. A **special anchorage** is in the cove on the west side of Blackhole Creek 0.2 mile above the entrance. (See **110.1** and **110.72,** chapter 2, for limits and regulations.)

Mill Creek and **Dividing Creek** have a common entrance on the south side of Magothy River, 3.8 miles above the mouth. Depths of 8 to 12 feet can be carried in both creeks for about 0.3 mile. A small-craft facility just inside Mill Creek has gasoline, water, berths, and marine supplies. Hull and engine repairs can be made; marine railway, 36 feet; lift, 20 tons.

Cypress Creek is on the southwest side of Magothy River 4 miles above the mouth. The creek is entered by a narrow, marked dredged channel. In 1966, the channel had a controlling depth of 7 feet. Depths of 9 feet are inside the creek, with gradual shoaling to the flats at the head. Hull and engine repairs can be made at a boatyard on the east side of the creek just inside the entrance; marine railway, 45 feet; platform lift, 50 tons.

Gasoline, water, and marine supplies are available on the southwest side of Magothy River, 5 miles above the mouth. Repairs can be made; lift, 25 tons.

14. CHESAPEAKE BAY, EASTERN SHORE

This chapter describes the Eastern Shore of Chesapeake Bay from Cape Charles to Swan Point, about 6 miles northward of the entrance to Chester River, and several bodies of water and their tributaries that empty into this part of the bay. Included are Pocomoke Sound, Pocomoke River, Tangier Sound, Wicomico River, Nanticoke River, Little Choptank River, Choptank River, Eastern Bay, and Chester River, and the off-lying islands of Tangier, Smith, Hooper, and Tilghman.

Also described are the ports of Cape Charles, Pocomoke City, Tangier, Crisfield, Salisbury, Easton, Cambridge, St. Michaels, and several smaller ports and landings.

COLREGS Demarcation Lines.–The lines established for Chesapeake Bay are described in **80.510,** chapter 2.

During the ice navigation season, the Maryland waters of Chesapeake Bay described in this chapter are a **regulated navigation area.** (See **165.503,** chapter 2, for limits and regulations.)

Charts 12221, 12225, 12230, 12263, 12273.– The Eastern Shore of Chesapeake Bay, from Cape Charles to Chester River, is mostly low and has few prominent natural features. The mainland and the islands are subject to erosion, and many of the islands and points have completely washed away. **Fishtrap** limits are shown on the charts and usually are marked by black and white horizontal-banded buoys. In the tributaries of Pocomoke Sound, **ice** sufficient to interfere with the navigation of small vessels may be encountered at any time from January through March. The ice from Pocomoke Sound does not interfere with the larger vessels in the bay, but the smaller oyster and fishing boats frequently are held up and sometimes require assistance, especially in Kedges and Hooper Straits.

Charts 12224.–Wise Point (37°07.0′N., 75°58.3′W.), the mainland tip of Cape Charles, is included in chapter 9, which also describes Fishermans Island, Cape Charles Light on Smith Island, and the Atlantic entrance to Chesapeake Bay.

Kiptopeke Beach, 3.2 miles northward of Wise Point, is the site of a former ferry terminal. The offshore breakwaters are obsolete ships filled with sand and sunk end-to-end. Just northward of the abandoned terminal is **Butlers Bluff,** which has steep bare faces conspicuous from the bay.

Old Plantation Creek, 7 miles northward of Wise Point, has depths of about a foot. Many of the bars and middle grounds are marked by discolored water, and the channel usually is marked by bush stakes, but it is narrow and difficult to navigate without local knowledge. The opening in the thick woods at the mouth is visible from outside. No supplies are available along the creek.

Old Plantation Flats Light (37°13.7′N., 76°02.8′W.), 35 feet above the water, is shown from a pile with a black and white diamond-shaped daymark in 11 feet on the north end of the flats about 1.5 miles from shore. The current velocity is about 1.3 knots 0.5 mile west of the light.

Cape Charles Harbor, 9 miles northward of Wise Point, is a dredged basin on the south side of the town of **Cape Charles.** A well-marked dredged channel just north of Old Plantation Flats Light leads to the harbor between sand flats on the south and a stone jetty on the north. Two small dredged basins are eastward of the main harbor basin. The northerly basin is known as the Harbor of Refuge, and the southerly basin as Mud Creek Basin. In May 1987, the dredged channel to Cape Charles Harbor had a controlling depth of 10 feet with 11 to 17 feet available in the harbor basin; thence depths of 4½ to 8 feet were available in the Harbor of Refuge basin and 6½ to 10 feet were available in Mud Creek Basin except for shoaling to bare at the NE corner.

Cape Charles Coast Guard Station is on the spit between Mud Creek and the Harbor of Refuge.

The mean range of tide is 2.4 feet at Cape Charles. The tidal currents set across the entrance to and across the southwest section of the dredged channel, but farther north they follow the general direction of the axis. The channel is exposed to westerly winds, but is partially protected by the flats to the westward, and seldom is too rough for motorboats. However, during severe W weather heavy surges may occur in the harbor. Ice may hinder navigation in the harbor during severe winters. Because of the limited space in the channel and harbor, the larger vessels and tows occasionally are somewhat of a hazard to small boats.

Cape Charles is a **customs port of entry.**

Cape Charles Harbor is a terminus of the Eastern Shore Railroad. The railroad operates floats to Little Creek. Floats are usually brought into the harbor in the late afternoon, although there are also occasional early morning arrivals. Due to the limited maneuvering room in the channel and the harbor, larger vessels and tows are sometimes a hazard to small craft. The tugs that handle the floats monitor VHF-FM channels 13 and 16.

There is public access to the bulkheads and slips at the eastern end of the harbor. Anchoring is forbidden in any part of the harbor or the basins. A "no-wake" **speed limit** is enforced. A **harbormaster** enforces harbor regulations, and a **dockmaster** supervises docking at the municipal facilities. Gasoline, diesel fuel, and water are available. Some marine supplies may be obtained in town.

Cherrystone Channel is a passage inside Old Plantation Flats that leads from deep water 2 miles south-southeastward of Old Plantation Flats Light northward to Kings Creek and Cherrystone Inlet. The route follows part of the dredged channel to Cape Charles Harbor for about 1 mile. That part of Cherrystone Channel southward of the dredged channel to Cape Charles Harbor is unmarked and little used. Cherrystone Channel above Cape Charles Harbor is marked by lights and daybeacons to the vicinity of **Sandy Island.** This part of the channel has depths of about 10 feet, but is narrow in places, and local knowledge is required to carry the best water. The recommended southerly approach to Kings Creek and Cherrystone Inlet is via the marked dredged channel to Cape Charles Harbor, which was discussed earlier in this chapter.

Kings Creek, about 1 mile northward of Cape Charles Harbor and eastward of Sandy Island, has depths of 3½ feet for 1 mile upstream. The shoal that extends out from the north side of the entrance bares at low water; lights and daybeacons mark the entrance. The creek is used extensively by fishermen and pleasure craft. Gasoline, berths, and some marine supplies are available at a marina just inside the entrance; a marine railway can haul out boats up to 60 feet for minor repairs.

Cherrystone Inlet, which extends northeastward from Sandy Island, has depths of 5 feet for 2 miles, thence 4 to 2 feet to the upper end. The channel in the inlet sometimes is

marked by bush stakes, but it is narrow and difficult to navigate without local knowlege.

Boats bound for Kings Creek or Cherrystone Inlet can leave the Cape Charles Harbor channel west of the jetty on the north side of the harbor entrance and proceed northward in marked Cherrystone Channel. Depths of 2 to 4 feet over the flats that extend southward for 2 miles along the west side of Cherrystone Channel from Sandy Island limit the draft that can be carried over that area from westward and northwestward. The area between Sandy Island and **Wescoat Point,** 0.3 mile to the northward, bares at low water.

A fish haven, marked by private buoys, is about 1.8 miles northwest of Wescoat Point.

Chart 12226.–Hungars Creek and **Mattawoman Creek** have a common outlet (37°23.7′N., 75°59.4′W.) to the bay 8 miles northward of Cape Charles Harbor (see chart 12224). Hungars Creek is marked by lights, daybeacons, and bush stakes, and Mattawoman Creek by bush stakes. Both creeks are difficult to follow without local knowledge.

Hungars Creek extends about 4 miles in a northeasterly direction to **Bridgetown.** Depths of 3 feet are available in the narrow entrance channel, marked by lights, thence decreasing to 1 foot to Bridgetown.

Mattawoman Creek extends about 2 miles in a southeasterly direction and has several branches at its head. The best approach is to follow the lights at the entrance of Hungars Creek to the light off **Wilsonia Neck,** then follow the bush stakes southeastward and southward along the shore. The controlling depth is about a foot to the head of navigation. The overhead power cables near the head of the creek have a minimum clearance of 33 feet.

A **danger zone** for naval firing begins about 12 miles north-northwestward of Cape Charles Harbor and extends northward to Tangier Sound Light, just south of **Tangier Island.** (See **334.220**, chapter 2, for limits and regulations.)

Nassawadox Creek, 13 miles northward of Cape Charles Harbor and about 5 miles northward of the entrance to Hungars Creek and Mattawoman Creek, extends about 5 miles to the northeast. The controlling depth across the bar is about a foot, thence 4 feet for 4 miles upstream. The channel is marked by a light, buoys and daybeacons for about 1.6 miles, but local knowledge is necessary to carry the best water. An overhead power cable with a clearance of 38 feet crosses the creek about 3 miles above the mouth. The flats on either side of the entrance are nearly bare at low water, are covered by marsh grass in the summer, and are usually well defined. The mean range of tide is 1.8 feet. **Bayford,** on the southeast side of the creek 1.5 miles above the mouth, has a wharf and a store. Gasoline and diesel fuel are available. The several creeks that branch off from Nassawadox Creek have depths of 3 feet or less. A marine railway at **The Saltworks,** on the north side of the creek, can handle boats up to 35 feet for hull and engine repairs.

Occohannock Creek (37°33.0′N., 75°56.3′W.) flows into Chesapeake Bay from eastward 18 miles northward of Cape Charles Harbor; a fixed bridge 5.4 miles above the entrance is the head of navigation. In 1979, the controlling depth was 5½ feet over the bar to about 0.7 mile inside the entrance. Depths of about 5 feet can be carried to **Morley Wharf,** on the south side 4 miles above the entrance, with lesser depths to the fixed bridge. The mean range of tide is 1.8 feet.

The channel over the bar of Occohannock Creek is marked by lights and daybeacons, but it is narrow and tortuous, and difficult to navigate without local knowledge. The channel within the creek also is narrow, but the ends of the shoals are marked by daybeacons all the way to Morley Wharf. A public pier and boat ramp are at Morley Wharf. Gasoline and limited marine supplies are available at **Davis Wharf,** on the north side of the creek; a marine railway can handle boats up to 40 feet.

Nandua Creek, 23 miles northward of Cape Charles Harbor and about 5 miles northward of Occohannock Creek, is entered through a dredged channel which leads across the bar to the mouth of the creek. In August 1985, the controlling depth was 4½ feet in the bar channel. Depths of about 4 feet can be carried in the creek channel to the wharf in ruins at the settlement of **Nandua,** 3 miles above the mouth. The mean range of tide is 1.7 feet. The bar channel, marked by a light and daybeacons, is narrow and shifting; local knowledge is required to carry the best water. The shoals at the entrance usually can be distinguished by the difference in color of the water, except in rough weather when the water is clouded. Daybeacons mark the critical parts of the channel to Nandua.

Back Creek, on the north side of Nandua Creek, 1 mile above the mouth, has depths of 3 feet to the village of **Hacks Neck.**

Pungoteague Creek, 3 miles northeastward of Nandua Creek, has depths of 8 feet to the pier at **Harborton,** 2 miles above the mouth, and thence 4 feet to the ruins of **Boggs Wharf,** 3 miles above the mouth. Above this point the creek shoals rapidly. The entrance and inside channel are marked as far as Harborton. The mean range of tide is 1.7 feet. Barges load pulpwood at Harborton for delivery to West Point on York River.

Chart 12228.–Onancock Creek (37°43.4′N., 75°51.1′W.), 38 miles north of Cape Charles, has traffic in petroleum products, sand, and gravel. A marked dredged channel leads across the entrance bar and up the creek to **Onancock,** 4.3 miles above the mouth. In July-August 1979, the controlling depth was 5½ feet (11 feet at midchannel) to Onancock. In 1980, shoaling was reported along the northeast side of the channel between Daybeacons 27 and 29. The mean range of tide is 1.8 feet.

A boatyard at **Poplar Cove Wharf,** 2.3 miles above the mouth of Onancock Creek, can haul out boats up to 40 feet for repairs. Gasoline can be obtained.

The anchorage basin in the entrance to **South Branch,** just below Onancock, had depths of 5 feet in July-August 1979; **North Branch,** on the north side of Onancock, had depths of 10 feet to the end of a turning basin 0.2 mile above the junction with Onancock Creek in July-August 1979, and **Central Branch,** on the south side of Onancock, had depths of 4 feet to the first bridge.

Water and electricity are available at the public dock at Onancock. Gasoline is available at the oil wharf opposite the town dock. Diesel fuel is available by truck.

Chesconessex Creek is 2 miles northward of Onancock Creek. In February 1976, shoaling to an unknown extent was reported in the approach to the creek between Chesconessex Buoy 1 and Light 2. Above Light 2, depths are about 8 feet for 1 mile above the mouth to the middle of **Tobacco Island,** thence in 1977, 6 feet to **Chesconessex,** 2 miles above the mouth, and 2 feet for 0.4 mile above the town. The creek is used by small local boats.

The approach to Chesconessex Creek from eastward of Watts Island Light is marked by buoys and a light; the channel above the entrance is marked by daybeacons and sometimes bush stakes. Gasoline is available at Chesconessex; a marine railway can haul out craft up to 40 feet for minor hull repairs.

The southern and main entrance to **Pocomoke Sound,** between the southern end of **Watts Island** and **Pocomoke**

Sound Light 6 (37°47.8′N., 75°50.4′W.), is 40 miles northward of Cape Charles. Extensive flats occupy most of the sound. A channel, wide and deep at the entrance but comparatively shallow in its most northerly part, leads to Pocomoke River, the most important tributary.

The shores of Pocomoke Sound are low and without prominent natural landmarks. The critical points along the main channel between the entrance and the mouth of Pocomoke River are marked by lights and buoys. The Virginia-Maryland boundary line is marked by buoys with orange and white bands, and diamond-shaped white daybeacons with orange reflective borders.

The sound is used by many local oyster and fishing boats and by some tugs and barges. Small boats can enter from northwestward in Tangier Sound by way of Broad Creek, which is discussed later. The mean range of tide is about 2 feet in Pocomoke Sound. (For current predictions, see the Tidal Current Tables.)

A string of marshy islands and large shoals separates the lower part of Pocomoke Sound from Tangier Sound on the westward. **Watts Island,** southernmost of the string, is marshy and wooded. Watts Island Rocks Light is 0.6 mile south-southwestward of the island.

Little Fox Island, 5 miles northward of the entrance, is low with flats between it and Watts Island. The flats are shallow and should not be navigated without local knowledge. **Great Thorofare,** just northward of Little Fox Island, has depths of 2 feet and is sometimes used by local boats.

Great Fox Island, 6 miles northward of the entrance to Pocomoke Sound, consists of a group of low islands, the northeasternmost of which is marked by a large building.

Just north of Pocomoke Sound Light 6 (37°47.8′N., 75°50.4′W.), a marked crooked tributary channel with depths of 8 feet or more leads between shallow flats for 5 miles into a dredged channel in Deep Creek. In August-September 1972, the midchannel controlling depth in the dredged channel to and in the turning basin at the town of **Deep Creek,** a distance of about 2.3 miles, was 3 feet. The channel is marked by lights and daybeacons.

Deep Creek is used only by small local boats, many of which enter from Hunting Creek on the eastward by way of **The Notch,** a passage behind the 1.5 mile chain of islands which separates the outer parts of the two creeks; the controlling depth in The Notch is about 2 feet; the channel is marked by bush stakes.

Another tributary channel, 3.5 miles northeastward of Pocomoke Sound Light 6, leads to **Hunting Creek** along the south side of **Guilford Flats** and southward through **The Thorofare** to the wharf at **Hopkins** on the east side of Hunting Creek, 2.5 miles above the mouth. The marked channel has depths of 7 feet or more to within 0.7 mile of Hopkins, thence 2½ feet to the wharf.

Guilford Creek is 2.5 miles northeastward of Hunting Creek, with which it has a common approach from the main channel as far as the inner buoy on the south side of Guilford Flats. The channel to Guilford Creek continues eastward along the flats, then turns northeastward and rounds a light off the mouth of the creek; the total distance from the main channel is about 8 miles and depths are 8 feet or more all the way. Within Guilford Creek the depths are 6 to 2 feet.

Messongo Creek empties into the east side of Pocomoke Sound 8 miles northeast of Pocomoke Sound Light 6. The marked approach to Messongo Creek is from west-southwestward. Depths of 7 feet at the mouth of the creek shoal gradually to about 1 foot at the village of **Marsh Market,** 2.5 miles above. The creek is used only by small local boats.

Starling Creek is on the southeast side of Pocomoke Sound 9 miles northeast of Pocomoke Sound Light 6. A dredged channel, marked by lights and daybeacons, leads from the sound to a harbor basin on the north side of the creek. In June 1986, the controlling depth in most of the channel was less than ½ foot, however, 3 feet could be carried along the southwest limit. Depths of 3 to 6 feet were in the basin, except for shoaling along the southwest edge. **Saxis,** on the northeast side of the creek, is the center of a considerable shellfish industry. Gasoline and diesel fuel can be obtained at the bulkhead, and some groceries are available in the town.

Charts 12228, 12230.–Pocomoke River flows into the northeast end of the Pocomoke Sound 15.5 miles above Pocomoke Sound Light 6. The river has traffic in petroleum products, sand and gravel, pulpwood, and some fish products. The buoyed approach through Pocomoke Sound has depths of 7 feet or more for 12.5 miles above the southern entrance, then the route passes through a marked dredged cut with a midchannel depth, in 1973–1979, of 7 feet for 3 miles to the mouth of Pocomoke River. The cut is subject to continual shoaling, and lesser depths may be found, particularly on the southerly side of the channel.

Pocomoke River has depths of 7 feet or more from the mouth for 14 miles to Pocomoke City, thence 5 feet or more for 12 miles to Snow Hill. Navigation is easy for 20 miles, but the remainder of the channel to Snow Hill is narrow and requires local knowledge to carry the best water. The mean range of tide is 2.4 feet at Shelltown and 1.6 feet at Pocomoke City, but is considerably affected by winds. Freshets cause a rise of 1 to 5 feet at Snow Hill, but are not dangerous. The water is fresh above **Rehobeth,** 7.5 miles above the mouth.

Shelltown is a village on the west bank of Pocomoke River 1 mile above the mouth. Gasoline, diesel fuel, and some supplies can be obtained in the village. Marine railways at Shelltown can handle craft up to 40 feet long.

Pocomoke City, on the east bank 14 miles above the mouth, has bus and rail communication, and all kinds of supplies. There are public bulkhead landings at the highway bascule bridge. The railroad bridge over the river at Pocomoke City has a swing span with a clearance of 4 feet; the best water is in the western opening. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) The overhead power cables 0.3 mile below the bridge have a clearance of 57 feet. The highway bridge 0.5 mile above the railroad bridge has a bascule span with a clearance of 3 feet. (See **117.1 through 117.59 and 117.569,** chapter 2, for drawbridge regulations.) The fixed highway bridge 1 mile above the railroad bridge has a clearance of 35 feet.

A dredged channel about 22 miles above the mouth of Pocomoke River leads southerly from the river to **Shad Landing State Park;** a marina and turning basin are at the head of the channel. In January 1983, the midchannel controlling depth was 4 feet in the channel, and depths of 6 to 7 feet were in the basin. The channel is marked by a light and a daybeacon. Gasoline and some supplies are available.

Storm warning signals are displayed. (See chart.)

Snow Hill, the town on the east bank 26 miles above the mouth, has rail freight service. The highway bridge just above the wharves has a 40-foot bascule span with a clearance of 2 feet. (See **117.1 through 117.59 and 117.569,** chapter 2, for drawbridge regulations.) An overhead power cable just above the bridge has a clearance of 61 feet. The river is navigable for 2 miles above the bridge. Gasoline and some supplies are available in the town.

A line of marshy islands and flats, with Tangier Island at

the south end, separates Tangier Sound from Chesapeake Bay to the westward; the principal thorofares between the islands are Kedges and Hooper Straits.

The danger zone of a naval missile target area is centered about 3.5 miles west-southwest of **Tangier Island**. (See **334.210,** chapter 2, for limits and regulations.) Sunken ships and other obstructions are within the area.

Tangier Island is low, sparsely wooded in the middle, and bare on the north and south ends. **Tangier** is the village midway along the eastern side of the island; a church spire and two television towers are prominent. Oystering, crabbing, and fishing are the principal industries. The island has telephone and motorboat communication with Crisfield.

Tangier Sound Light (37°47.3′N., 75°58.5′W.), 41 feet above the water, is shown from a white square tower with a red and white diamond-shaped daymark on piles, in depths of 5 feet. The light is 53.3 miles above the Virginia Capes.

Tangier Sound, its main entrance 1 mile northeastward of Tangier Sound Light, affords a broad and deep channel extending the 28-mile length of the sound. Extensive flats border the sound, but the critical points are marked by lights and buoys.

The town of Tangier can be reached from either Chesapeake Bay or Tangier Sound through well-marked dredged channels. In 1984-September 1985, the midchannel controlling depths were 7 feet from Chesapeake Bay and 8 feet from Tangier Sound; thence, a depth of 7 feet was in the anchorage basin at Tangier.

(**Note** that the numbering system of marking the aids to navigation in the channel from Chesapeake Bay to Tangier Sound and from Tangier Sound to Chesapeake Bay is not continuous but changes in about 37°49′54″N., 75°59′49″W.)

An overhead power cable with a clearance of 50 feet crosses the channel at Tangier. Gasoline, diesel fuel, and some marine supplies are available at Tangier; a marine railway here can handle craft up to 50 feet for hull and engine repairs.

The flats between Tangier Island and Smith Island, on the north, are shallow and can be navigated only by very small boats at high water.

Chart 12231.–Smith Island consists of a large group of marshy islands separated by narrow thorofares; travel from place to place is mostly by boat. **Tylerton, Ewell,** and **Rhodes Point** are small villages along the interior channels; crabbing, oystering, and fishing are the principal industries. Gasoline and diesel fuel are available at Ewell and only diesel fuel at Rhodes Point; some supplies can be obtained at the villages. The island has telephone and motorboat communication with Crisfield. A marine railway at Rhodes Point can haul out boats up to 40 feet for hull repairs.

A well-marked 5-mile channel with several dredged sections extends from Tangier Sound through **Big Thorofare** to Ewell, thence northwestward in **Levering Creek** and again through Big Thorofare to Cheseapeake Bay. In July 1985, the reported controlling depth was 5 feet from Tangier Sound to Ewell; thence in 1970-1974, 4½ feet from Ewell to Daybeacon 6; thence in April 1982, 7 feet to Chesapeake Bay.

There is a wreck on the south side of the channel in the vicinity of Big Thorofare West Daybeacon 2A.

A marked channel leads southward from Big Thorofare through **Tyler Ditch** to Tylerton, about 1.7 miles above the entrance. In May 1977, the controlling depth was 6 feet for a midwidth of 40 feet in the dredged section of the channel, thence natural depths of about 5 feet to Tylerton. In July 1985, shoaling to 3½ feet was reported in the dredged section of the channel between Light 31 and Daybeacon 1. An overhead power cable across Tyler Ditch just north of Tylerton has a clearance of 72 feet.

Another marked dredged channel from Tylerton to Rhodes Point, in May 1977, had a controlling depth of 6 feet for a midwidth of 40 feet. An overhead power cable across the west end of the channel has a clearance of 57 feet. Local fishermen in shallow-draft boats sometimes approach Tylerton from southward at high water, leaving the main channel in Tangier Sound 7 miles north of Tangier Sound Light and following the deeper water northward into Tyler Creek. The depth in the southern approach is about 4 feet.

Sheep Pen Gut is the approach to Rhodes Point from the west. A dredged channel marked by daybeacons leads from Chesapeake Bay through the gut. In 1982, the controlling depth was 2½ feet. In July 1984, severe shoaling was reported in the channel. Several other thorofares, with depths less than 3 feet, lead westward from the interior of Smith Island to Chesapeake Bay. Navigation of these channels requires local knowledge.

Kedges Straits, between Smith Island on the south and uninhabited **South Marsh Island** on the north, is used by vessels bound from northward in Chesapeake Bay to points southward of Manokin River in Tangier Sound. The inner approach to the straits is about 16 miles north of Tangier Sound Light. A depth of 10 feet can be carried through the marked straits.

In May 1980, a submerged obstruction was reported to be northwest of the entrance to Kedges Straits in about 38°06.5′N., 76°07.5′W.

Holland Island Bar Light (38°04.1′N., 76°05.7′W.), 37 feet above the water, is shown from a white square house with a black and white diamond-shaped daymark on piles in depths of 9 feet on the north side of the bay approach to Kedges Straits; a seasonal fog signal is at the light, which is 6.3 miles due east of a point on the bay ship channel 72.6 miles above the Virginia Capes.

Solomons Lump Light (38°02.9′N., 76°00.9′W.), 47 feet above the water, is shown from a white octagonal dwelling, with a square tower, on a brown cylindrical base, in depths of 7 feet on the Smith Island side of Kedges Straits.

The mean range of tide in Kedges Straits is 1.7 feet, but it is affected considerably by winds. Easterly winds raise the water and northwesterly winds lower it sometimes as much as 2 feet below the normal level. In severe winters, floating ice makes navigation of the straits dangerous.

Holland Straits, on the north side of Kedges Straits between South Marsh Island on the south and **Bloodsworth Island** and other smaller uninhabited low marshy islands on the north, is generally shallow and should not be used without local knowledge. Sandbars obstruct the Chesapeake Bay side and patches of eel grass uncover in the Tangier Sound entrance on the lower tides. Bloodsworth Island is within a **danger zone** for naval firing and bombing. A **prohibited area,** within the danger zone and with a radius of 0.5 mile, is close off the western side of the island. (See **334.190,** chapter 2, for limits and regulations of the danger zone and prohibited area.)

Okahanikan Point Light (38°11.7′N., 76°05.6′W.), 85 feet above the water, is shown from an observation tower off the northwest side of Bloodsworth Island about 1.5 miles south of the bay entrance to Hooper Strait.

Hooper Strait, between Bloodsworth Island on the south and Hooper Islands and Bishops Head on the north, is the most northerly direct passage from Chesapeake Bay into Tangier Sound and is used by vessels bound from northward in the bay to tributaries at the north end of the sound. The

inner approach to the strait is 27 miles north of Tangier Sound Light.

The narrow, crooked channel through Hooper Strait, in June 1975, had a controlling depth of 12 feet. The shoals on each side are well marked; strangers should have little difficulty if they pay close attention to the chart. In July 1983, a sunken wreck, marked by a buoy, was about 750 yards west-southwest of Hooper Strait Light in about 38°13.5'N., 76°05.6'W. In 1977, a visible wreck was reported on the southwest side of Hooper Strait about 1.3 miles southeast of Hooper Strait Light. **Hooper Strait Light** (38°13.6'N., 76°04.5'W.), 41 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark in depths of 9 feet midway along the north side of the channel.

Sharkfin Shoal Light (38°12.1'N., 75°59.2' W.), 44 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark in depths of 7 feet on the south side of the approach from the main channel in Tangier Sound; a seasonal fog signal is at the light.

In 1978, a partially submerged wreck was reported about 0.2 mile north-northwest of Sharkfin Shoal Light, in about 38°12'20"N., 75°59'20"W.

The mean range of tide is 1.7 feet at Hooper Strait Light and 2.2 feet at Sharkfin Shoal Light, but in the fall and winter continual northerly winds may lower the water as much as 2 feet below normal level. The current velocity is about 1.5 knots; the current floods eastward through Hooper Strait. In the winter vessels navigating Hooper Strait are in danger from running ice.

Charts 12231, 12228.–Little Annemessex River (37°58.0'N., 75°53.8'W.), the approach to the town of Crisfield, empties into Tangier Sound 10 miles north of Tangier Sound Light. The entrance to the river is 0.8 mile wide between **Great Point** on the south and **Island Point,** the southwest end of **Janes Island,** on the north.

A fish haven is about 1.3 miles west-southwestward of Great Point.

The main entrance to Crisfield is through the well-marked dredged channel of Little Annemessex River. In April 1982, the midchannel controlling depth was 7½ feet to the junction with the spur channel to Hop Point; thence in 1975, a centerline controlling depth of 5 feet was reported to Daugherty Creek Canal. The spur channel to the wharves at **Hop Point** had a depth of 10 feet in April 1979, except for shoaling to 1½ feet at the upper end. **Brick Kiln Channel,** the L-shaped channel and mooring basin 0.5 mile to the northward, had depths of 6½ feet in the channel in April 1979 and 8 feet in the basin in 1968.

In July 1986, a sunken wreck was reported in the vicinity of Light 5 in about 37°58'N., 75°53'W.

The southerly approach to Crisfield from Pocomoke Sound, used extensively by oyster boats, is through crooked **Broad Creek.** In 1982, the controlling depths were 2 feet at the north end of the creek and 3½ feet at the south end. The northerly approach from Big Annemessex River is through marked **Daugherty Creek** and through **Daugherty Creek Canal;** in 1978, the controlling depth through the creek was 5 feet for about 0.6 mile to the mouth of the canal; in 1971, a controlling depth of 6½ feet was on the centerline of the canal channel to Light 18, just north of Crisfield harbor. The tidal current floods northward in the canal and ebbs southward; the velocity is reported to be about 1.3 knots.

The mean range of tide in Little Annemessex River is 2 feet. The current velocity is 0.9 knot.

Jenkins Creek, which enters Little Annemessex River close northeastward of Broad Creek, is used by fishermen and crabbers. Depths of 3 feet can be carried 0.5 mile above the mouth of the creek, thence 2 feet for 0.5 mile farther to the highway bridge with a 16-foot fixed span and a clearance of 6 feet; small boats pass through the bridge to piers on the north shore. The creek is marked by private daybeacons.

Crisfield, on the east side of Little Annemessex River 2 miles above the mouth, is a fish and seafood processing center. Waterborne commerce consists chiefly of seafood and petroleum products. The harbor is used by many oyster, fish, and crab boats with drafts of 2 to 6 feet. Small freight and passenger boats operate daily to Tangier and Smith Islands.

Crisfield is a **customs port of entry.**

The Crisfield waterfront is largely built up with bulkhead wharves and timber piers, most of which are privately owned, but open to the public on equal terms. Some of the terminals have mechanical freight-handling equipment, but most of the freight is transferred by hand. Depths at the wharves and piers range from 5 to 12 feet, the deepest being at the outer end of the railroad pier.

Somers Cove, a well protected basin on the south side of Crisfield, has a controlling depth of about 10 feet in the entrance channel and basin. It is necessary to make a sharp turn into the basin at the entrance light. A state owned full service marina is on the north side of the cove. A Coast Guard search and rescue vessel is moored on the south side of the cove.

Supplies, gasoline, and diesel fuel are available at Crisfield. The largest marine railway can haul out vessels up to 135 feet in length for repairs; a 35-ton mobile lift is also available.

Chart 12231.–Big Annemessex River (38°02.9'N. 75°52.3'W.) joins Tangier Sound 15 miles north of Tangier Sound Light. The river has depths of 8 feet for 4 miles, thence 5 feet for 1 mile, and thence 3 feet for 1 mile. The channel is marked as far as Colbourn Creek. The mean range of tide is 2.1 feet.

Daugherty Creek, already described, enters the south side of Big Annemessex River 1.3 miles above the mouth. **Jones Creek,** close eastward of the canal, has depths of 2 feet for about 1.5 miles above the mouth. The channel is narrow and crooked; private daybeacons mark the channel.

Colbourn Creek, on the south side of Big Annemessex River 3.5 miles above the mouth, has depths of 4 feet for about 0.7 mile, thence 2 feet for 0.5 mile. Excellent storm anchorage with good holding ground is available in depths of 5 feet in midstream 0.3 mile above the entrance.

Manokin River, on the east side of Tangier Sound 16 miles north of Tangier Sound Light, is directly across the sound from Kedges Straits, described earlier. The entrance to the river is 3.5 miles wide between **Hazard Point** on the southeast and low **Little Deal Island** on the northwest, but is obstructed by numerous shoals.

The main channel of Manokin River is narrow and crooked, and favors the southeast shore. The channel has depths of about 9 feet to abeam of **St. Pierre Island,** on the north side 4 miles above the mouth, thence 6 feet to within 0.5 mile of **Locust Point,** on the northwest side 7 miles above the mouth, and thence 1 foot to **Princess Anne,** 15 miles upstream.

In August 1980, a submerged obstruction was reported about 150 yards southward of Manokin River Light 4 in about 38°05'50"N., 75°52'53"W. The channel is marked to a point about 6 miles above the mouth. The lower of the two fixed highway bridges, 14 miles above the mouth, has a

clearance of 3 feet. The mean range of tide in Manokin River is 2.1 feet. Most of the piers and wharves along the river are in poor condition.

Goose Creek, on the south side of Manokin River 1.3 miles above Hazard Point, is used by local fishermen and pleasure craft. In 1982, a channel marked with lights and daybeacons and leading to the village of **Rumbley** on the northeast side of the creek had a controlling depth of 3½ feet. Goose Creek has considerable traffic in crabs and oysters. Berths, gasoline, diesel fuel, and marine supplies are available. Hull and engine repairs can be made; a 15-ton mobile lift is available.

St. Peters Creek, used mostly by fishing boats, is on the north side of Manokin River 5.5 miles above the mouth. A marked dredged channel leads to a basin and public wharf 1 mile above the entrance. In January 1983, the channel had a controlling depth of 3½ feet (5 feet at midchannel); depths of 4 to 5 feet were available in the basin.

A marked dredged channel, 21 miles north of Tangier Sound Light, leads through **Lower Thorofare** between **Little Deal Island** and **Deal Island** to a mooring basin with bulkhead and several small piers at the fishing village of **Wenona.** In 1979, the controlling depth was 6 feet in the channel and basin. In July 1984, shoaling to an unknown extent was reported in the channel in the vicinity of Daybeacon 7. Gasoline, diesel fuel, and some supplies can be obtained at the village.

Another marked dredged channel, 25 miles north of Tangier Sound Light, leads through the west end of **Upper Thorofare** to an anchorage basin at the north end of Deal Island. In July 1984, the channel had a centerline controlling depth of ½ foot, thence the anchorage basin had depths of 2½ to 5 feet, except for shoaling to bare in that part of the basin north of the entrance channel. A wreck with 2 feet over it lies in the northwest corner of the basin. The highway bridge across the north end of the thorofare has a 20-foot fixed span with a clearance of 10 feet. On the northwest side of the bridge is an overhead power cable with a clearance of 34 feet, but there is sufficient water for some high-masted vessels to drift close enough to touch the wires; extreme caution should be observed. In September 1986, a replacement fixed highway bridge with a design clearance of 25 feet was under construction close southeast of the existing bridge. A boatyard just east of the bridges has a mobile lift that can handle boats up to 15 tons for repairs. Gasoline, diesel fuel, berths, and some supplies are available. Beyond the bridge, least depths are about 1 foot southeastward for 2.5 miles to Manokin River.

Chart 12261.–Wicomico River flows into the north end of Tangier Sound eastward of the inner approach to Hooper Strait, described earlier, and 26 miles north of Tangier Sound Light. The entrance to Wicomico River is 1.5 miles wide between **Long Point** on the south and Nanticoke Point on the north. Waterborne commerce is largely in fish and shellfish, and fish byproducts.

In 1975-1983, the controlling depths in the marked channel in Wicomico River were 10 feet for a midwidth of 75 feet from the entrance to **Williams Point,** about 19 miles above the mouth; thence in 1977, 13 feet for a midwidth of 75 feet to South Prong at Salisbury.

Great Shoals Light (38°12.8′N., 75°52.8′W.), 37 feet above the water, is shown from a white skeleton tower with a red and white diamond-shaped daymark on piles in depths of 4 feet on the north side of the channel, 0.5 mile above the mouth; a seasonal fog signal is at the light.

The mean range of tide in Wicomico River is 2.3 feet at the entrance and 3 feet at Salisbury. Strong tidal currents set across the main channel off Monie Bay; the current velocity in the entrance to the river is 0.6 knot on the flood and 0.9 knot on the ebb. Ice usually forms on the river as far down as Whitehaven; in ordinary winters the channel usually is open to navigation, but in severe winters it is often closed for extended periods.

Monie Bay is a large cove on the southeast side close within the mouth of Wicomico River. The bay has depths of 4 feet to the head, but is used only by small local boats.

Webster Cove, on the south side 3.5 miles upriver, is entered by a marked dredged channel which leads to a public wharf inside. In May 1984, the reported centerline controlling depth was 3½ feet.

Whitehaven, on the north bank 6.5 miles above the entrance, has some supplies. Most of the docks are in poor condition. A marine railway can haul out boats up to 150 feet.

A cable ferry crosses the river at Whitehaven. The ferry operates only during daylight hours. The cable is picked up as the ferry moves from bank to bank and is dropped to the bottom when the ferry is not operating. The crossing is unmarked. Caution should be exercised while navigating in the area. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

Wicomico Creek, on the south side of Wicomico River 8.5 miles above the mouth, is navigable for small craft for several miles. The marked entrance channel has a controlling depth of about 4 feet with deeper water inside. A small yacht club on the north side of the entrance has gasoline and diesel fuel. A marina about 2.3 miles above the entrance has gasoline, diesel fuel, berths, and marine supplies. Hull and engine repairs can be made; a mobile lift is available.

An overhead power cable about 14 miles above the mouth of Wicomico River has a clearance of 75 feet.

A cable ferry crosses the Wicomico River at **Upper Ferry,** 15 miles above the mouth. The ferry operates only during daylight hours. The cable, held taut by winches ashore, is suspended at or near the water's surface at all times during daylight hours, but dropped to the bottom during nondaylight hours. The signal for lowering the cable is one blast on the whistle by a transiting vessel. The ferry slips are marked as a ferry crossing and warning signs are posted up and downstream of the crossing. Caution should be exercised when navigating in the area. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

Fishing boats use the large wharf on the south bank, 16.5 miles above the mouth; water is available. An overhead power cable, 17.7 miles above the mouth, has a clearance of 137 feet.

Shad Point is 18 miles above the mouth on the southeast side.

Salisbury, the head of navigation 20 miles above the mouth, is a major trading center of the Eastern Shore. Wicomico River forks at the city; the **North Prong,** in 1976–1977, had a controlling depth of 7½ feet or 10 feet at midchannel to the fixed bridge 0.4 mile upstream, but **South Prong** is rarely used. The Main Street highway bridge and the U.S. 50 highway bridge over the entrance to North Prong have 40-foot-wide bascule spans with a minimum clearance of 1 foot. The bridgetenders monitor VHF-FM channel 16 and work on channels 13 and 68; call signs KZA-869 and KYU-697, respectively. (See **117.1 through 117.59 and 117.579,** chapter 2, for drawbridge regulations.)

Salisbury is a **customs station.**

Most of the commercial wharves are below the fork, but there are some in North Prong. Traffic to Salisbury consists of petroleum, aggregates, grain, and fertilizer.

Nanticoke River flows into the north end of Tangier

Sound 29 miles north of Tangier Sound Light. Waterborne commerce is mostly in petroleum products, but there is also sizable traffic in fertilizers, corn, soybeans, pulpwood, shellfish, and shells.

Mileages on Nanticoke River, such as Mile 11W, 19.6E, etc., are the nautical miles above the entrance which is between Nanticoke Point on the east side and **Clay Island** on the west. The letters N, S, E, or W following the numerals indicate the side of the river by compass direction where each feature is located.

A depth of about 11 feet can be carried to Sharptown; local knowledge is advised. In 1960-November 1983, the midchannel controlling depth was 6½ feet in the marked channel from Sharptown to the highway bridge at Seaford, Delaware. From the mouth to Wetipquin Creek, the river is more than 1 mile wide, and is obstructed by extensive shoals, most of which are marked. The deepest water is usually near the points rather than in the bends.

The mean range of tide in Nanticoke River is 2.3 feet at the entrance and 2.2 feet at Vienna. The current velocity is 1.2 knots in the entrance. The water is fresh above Vienna. Ice forms on the river in winter, but ordinarily there is enough traffic to keep the channel open. Spring freshets do not interfere with navigation.

Nanticoke, Mile 2.5E, has two packing plants. A marked, dredged channel with a controlling depth of 3 feet in July 1984, leads to a small-boat harbor, protected by jetties, at the village.

Bivalve is at Mile 5.4E. A marked dredged channel leads to a municipal small-boat basin, 0.4 mile northeastward of the village. The basin is protected by jetties that are awash at high water. In August 1980, the controlling depths were 3 feet at midchannel in the entrance channel and 5 feet in the basin, with shoaling to bare along the southern limits of the entrance channel in about 38°18′39″N., 75°53′32″W. Gasoline, diesel fuel, berths, and limited marine supplies are available.

Wetipquin Creek, Mile 7.0E, has depths of 4 feet to the wharf at **Tyaskin** on the south side of the creek just inside the entrance; gasoline and some supplies are available.

Vienna, Mile 19.6W, has a public bulkhead wharf. A launching ramp is 100 yards below the bridge. Gasoline and some supplies can be obtained nearby.

The highway bridge over Nanticoke River at Vienna has a bascule span with a clearance of 18 feet. The bridgetender monitors VHF-FM channel 16 and works on channels 13 and 68; call sign KYQ-895. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) The overhead power cable crossing the river at the electric powerplant 100 yards above the bridge has a clearance of 135 feet.

Marshyhope Creek, Mile 24.1W, has depths of 5 feet to the Harrison Ferry bridge, 9 miles above the entrance, above which point the creek is obstructed by snags and debris. The highway bridge at **Brookview,** 5 miles above the entrance, is kept in the closed position with a clearance of 11 feet. (See **117.563,** chapter 2, for drawbridge regulations.)

Sharptown, Mile 26.1E, has a bulkhead wharf but little waterborne commerce. Pulpwood is loaded at the south end of town for West Point on York River. The highway bridge over the river at the town has a swing span with a clearance of 7 feet. The bridgetender monitors VHF-FM channel 16 and works on channels 13 and 68; call sign KYQ-896. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) In May 1985, a replacement fixed bridge with a design clearance of 50 feet was under construction just above the bascule bridge.

The Maryland-Delaware boundary line on Nanticoke River is at about Mile 27.5.

Broad Creek, Del., Mile 29.0E, has a controlling depth of about 5 feet to Laurel. Daybeacons and buoys mark the channel from the entrance to about 0.5 mile above Bethel. The fixed highway bridge at **Bethel,** 3.5 miles above the entrance, has a clearance of 30 feet. The overhead power cable close westward of the bridge has a clearance of 58 feet. **Laurel,** 6 miles above the entrance, has a fertilizer plant and several mills. The railroad bridge at Laurel has a swing span with the north opening obstructed; the south opening has a width of 40 feet and a clearance of 14 feet. Between this bridge and the dam, 0.3 mile upstream, are two drawbridges and a fixed bridge which have a minimum width of 37 feet and clearance of 2 feet. (See **117.1 through 117.59 and 117.233,** chapter 2, for drawbridge regulations.) There are several power cables and a telephone cable crossing the creek near the bridges at Laurel, which have a minimum clearance of 20 feet.

The vehicular cable ferry over Nanticoke River at **Woodland,** Mile 31.3W, operates during daylight hours only. The cables are picked up as the ferry moves from bank to bank and dropped to the bottom when it is not operating. The ferry crossing is not marked. Caution should be exercised. while navigating in the area. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

A power cable crossing at Mile 33.7 has a clearance of 75 feet.

Seaford, Del., Mile 34.7N, has several mills and factories. The Conrail bridge at Mile 34.4 has a swing span with a width of 47 feet in the southeast opening and no vertical clearance. (See **117.1 through 117.59 and 117.243,** chapter 2, for drawbridge regulations.)

The highway bridge at Mile 34.7 has a 40-foot bascule span with a clearance of 3 feet. (See **117.1b and 117.240,** chapter 2, for drawbridge regulations and opening signals.) Depths of 7 feet are said to extend 1.5 miles above the highway bridge, and small boats can go to a milldam 5 miles from the bridge, but there is little traffic above Seaford. Gasoline, diesel fuel, and some supplies are available in the town.

Fishing Bay is at the north end of Tangier Sound 28 miles north of Tangier Sound Light. The entrance to the bay is 3 miles wide between Clay Island on the east and **Bishops Head Point** on the west. The partially marked channel in Fishing Bay has depths of 9 feet for 2 miles, thence 13 to 30 feet for 4 miles, and thence 4 to 3 feet to the head, 9 miles above the mouth.

Tedious Creek, on the west side of the bay 2 miles above Bishops Head Point, has depths of 4 feet for 0.5 mile from the mouth, then for 0.7 mile shoals gradually to 1 foot at the head. The entrance is marked by a light. The cove at **Crocheron,** a village on the south side of the creek just inside the entrance, has a county wharf and ramp.

Goose Creek, on the west side of Fishing Bay 3 miles above the entrance, has a marked dredged channel which, in January 1979, had a controlling depth of 6 feet at midchannel to the wharves just inside; gasoline is available. **McCreadys Creek,** on the east side of Fishing Bay 4 miles above the entrance, has a marked dredged channel which, in December 1978, had a midchannel controlling depth of 5 feet to the wharves just inside. Gasoline and some supplies are available at the village of **Elliott,** 0.6 mile inland.

Farm Creek, on the west side of Fishing Bay 5 miles above the entrance, has a marked dredged channel which, in January 1979, had a midchannel controlling depth of 5½ feet to the wharves at **Toddville,** on the south side of the creek 0.6 mile upstream. Depths of about 3 feet have been reported at the entrance to the basin at the village. Gasoline and diesel fuel are available.

Honga River extends northwestward from the western part of Hooper Strait for 14 miles between the mainland on the northeast and the Hooper Islands on the southwest; the river is more than 1 mile wide for most of its length. Honga River has a sizable traffic in shellfish and shellfish products.

The southern and main entrance to Honga River is between Hooper Strait Light on the east and Honga River Light on the west. The narrow crooked channel in the river has depths of 13 to 55 feet as far as **Wroten Island,** on the east side 8.5 miles above the southern entrance, and thence 8 feet for 1.5 miles to the improved channel, described later, leading northwestward and westward to Fishing Creek. Depths northward of the Fishing Creek channel are 4 to 5 feet, shoaling gradually to 2 feet at the head. In August 1980, shoaling to 2½ feet was reported between Light 2 and Daybeacon 4 and to 2 feet between Light 5 and a point about 0.8 mile north of Light 5. The river is marked as far as Fishing Creek.

Fox Creek is on the northeast side of Honga River 2.5 miles above the entrance. A light marks the east side of the creek entrance, and a daybeacon marks the point of a shoal that extends southeastward from **Paul Point.** The creek has depths of 8 feet to a line from Paul Point to **Wingate Point,** on the east side 2 miles above the entrance, then shoals gradually to 1 foot at the head, 1 mile farther up.

Duck Point Cove, on the east side just inside the entrance of Fox Creek, has general depths of 2 to 5 feet. In May 1982, the marked dredged channel into **Hearns Cove,** on the north side of Duck Point Cove, had a midchannel controlling depth of 6 feet with 5 to 6 feet in the basin at **Wingate.** In 1983, shoaling to 4 feet was reported in the channel. The oyster-packing plants here have small wharves for the oyster boats. Gasoline is available.

A 2-foot channel marked by private stakes leads to a marine railway in **Insley Cove** at the northeastern end of Fox Creek; boats up to 50 feet can be handled for hull repairs.

The three **Hooper Islands** divide Honga River from Chesapeake Bay and Tar Bay. Middle and Upper Hooper Islands are connected with each other and with the mainland by bridges. **Hoopersville** is a village with general stores and packing plants on Middle Hooper Island, 3.5 miles above the southern entrance of Honga River. A dredged channel in **Muddy Hook Cove,** which is marked by a light and daybeacons, leads to a fish company-owned wharf at the village. In 1983, the controlling depth in the channel was 5½ feet with 3 to 6 feet in the basin. The westerly two of the three charted wrecks, just north of the channel, cover at high water and are hazardous to navigation. Gasoline and diesel fuel are available at the wharves.

The highway bridge over the passage between **Middle Hooper Island** and **Upper Hooper Island,** at **Ferry Point,** has a fixed span with a clearance of 35 feet. The marked passage through the bridge from Honga River to Chesapeake Bay has a controlling depth of about 2 feet, but greater depths can be carried with local knowledge.

Back Creek, midway along the inner side of Upper Hooper Island 8.8 miles above the river mouth, has a marked dredged channel which had a reported controlling depth of 6 feet in 1983. Oysterhouses and a marine railway are along the creek; boats up to 45 feet can be hauled out for repairs. Gasoline and some supplies can be obtained on Upper Hooper Island.

Wallace Creek empties into the eastern side of Honga River 12 miles above the mouth. A privately dredged channel, marked by daybeacons, leads from Honga River to a public landing and a marina at **Crossroads,** 1.9 miles above the entrance. In April 1981, the reported controlling depth was 3 feet. Berths, gasoline, diesel fuel, and some supplies are available.

Charts 12264, 12261.–A 4-mile dredged channel marked by lights leads from the upper part of Honga River, 10.3 miles above the mouth, through Fishing Creek and Tar Bay to Chesapeake Bay. In February 1980, the controlling depths in the channel were 3½ feet to just off the entrance to Tyler Creek; thence in December 1981, 4 feet through the remainder of Fishing Creek and through Tar Bay, thence 7 feet to Chesapeake Bay.

Fishing Creek lies between Upper Hooper Island and **Meekins Neck.** The highway bridge over the creek has a swing span with a width of 28 feet and a clearance of 6 feet; the draw is opened from sunrise to sunset. The bridgetender monitors VHF-FM channel 16 and works on channels 13 and 68; call sign KYU-695. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) The overhead power cable just west of the bridge has a clearance of 65 feet. The mean range of tide is 1.3 feet. The current velocity is estimated to be 3 knots. A public wharf and several private wharves are along the creek.

A dredged channel in **Tyler Creek,** just west of the bridge and on the north side of Fishing Creek, leads to an anchorage basin in **Tyler Cove.** The channel to the basin is marked by a light and a daybeacon. In February 1980, the controlling depth was 2 feet in the west half of the entrance channel, thence depths of 3½ to 6½ feet were in the basin; shoaling to bare was in the south part of the east half of the entrance channel. The largest marine railway can handle boats up to 45 feet for repairs; some supplies can be obtained at **Honga,** on the south side at the bridge. A marina 0.3 mile west of the bridge has gasoline, diesel fuel, and berths; the narrow entrance channel, marked by bush stakes, has depths of about 3 feet.

Tar Bay, west of Meekins Neck and Upper Hooper Island, is separated from Chesapeake Bay by Barren Island and a smaller island to the northward. The bay is shallow and unimportant except for the channel that leads through it from Honga River to Chesapeake Bay.

Chart 12266.–Sharps Island Light (38°38.3′ N., 76°22.5′ W.), 54 feet above the water, is shown from a leaning, brown tower on a cylindrical pier, in 10 feet at the north end of a shoal that bares at the east end. A seasonal fog signal is at the light. The light is 2.9 miles due east of a point on the bay ship channel 108.2 miles above the Virginia Capes. A rock, covered 2 feet, and a wreck close eastward cleared to a depth of 6 feet, are about 0.4 mile south-southeastward of the light. A group of rocks, 1.4 miles south-southeast of the light, sometimes awash at low tide, is all that remains of Sharps Island. Submerged pilings are about 0.2 mile southwestward of the rocks.

Little Choptank River joins the eastern side of Chesapeake Bay 6 miles south-southeastward of Sharps Island Light. Although obstructed by shoals, the river has depths of 11 feet in a crooked channel for 7 miles and the tributaries have depths of 5 feet for considerable distances. The river is marked as far as Fishing Creek, above which it is difficult to carry more than 7 feet without local knowledge. The tributary channels are usually marked by bush stakes, but navigation is difficult without some local information.

The mean range of tide in the entrance to Little Choptank River is 1.4 feet. The current velocity is about 0.3 knot. The river carries some commercial traffic in shellfish and shells.

The entrance to Little Choptank River is between **James Island** on the southwest and **Hills Point** on the northeast.

James Island is subject to rapid erosion. Good anchorage is available in depths of 12 to 18 feet in the bight between James Island and **Hooper Point,** which is on the west side of the entrance to Slaughter Creek.

Slaughter Creek (chart 12264), on the south side of Little Choptank River 4 miles above the mouth, has depths of 4 feet over the bar, thence 6 feet to the bridge at the village of **Taylors Island,** 2 miles above the entrance. The creek is marked by lights and daybeacons; a daybeacon on the west side of the entrance marks a submerged pile. In August 1980, shoaling to 1½ feet was reported between Light 2 and Light 4. The creek is used by oyster tongers and crab fishermen. A marina on the east side of the creek just north of the bridge has gasoline, diesel fuel, some supplies, and berths; a 25-ton mobile hoist is available for repairs. **Taylors Island Coast Guard Station** is on a houseboat moored about 1.6 miles south of Hooper Point.

Brooks Creek, on the north side of Little Choptank River 5 miles above the mouth, has depths of 10 to 4 feet in a narrow channel for 2 miles then depths decrease to 2 feet at the head. The narrow entrance is marked, but local knowledge is required to carry the best water. There are small-craft facilities on the west side of the creek along Hills Point Neck. A marine railway can handle boats up to 40 feet for repairs.

Hudson Creek, on the north side of Little Choptank River 6 miles above the mouth, has depths of 5 feet for 3.2 miles to just below **Hudson,** a village at the head. The entrance is marked, and the upper reaches usually are bush-staked. The wharves at Hudson are in poor condition.

Madison Bay, on the south side of the river opposite Hudson Creek, has depths of 1 to 9 feet. The entrance to the bay is marked by a light. A dredged channel, marked by daybeacons, leads through the upper part of the bay to a turning basin. The east end of the turning basin is connected to an anchorage basin at **Madison,** a village at the head of the bay. In March 1983, the controlling depths were 5 feet in the dredged channel and 4½ to 7 feet in the turning basin; thence in 1981, depths of 6 to 8 feet were in the anchorage basin and 2 feet in the channel south of the basins. Gasoline, diesel fuel, and some supplies are available at the wharf at Madison.

Fishing Creek, on the southeast side 7 miles above the river mouth, has a controlling depth of 5 feet for 4 miles to the forks at the head. The channel is narrow and crooked, and difficult to navigate without local knowledge. There are several small piers along the creek which is used extensively by boats bound for Church Creek, the principal tributary. The entrance is marked by daybeacons, and the upper reaches usually are marked by bush stakes. **Northeast Branch** and **Southeast Branch** have depths of 3 feet.

Church Creek, on the south side of Fishing Creek 2.5 miles above the latter's mouth, has depths of 6 feet for 0.8 mile, thence 4 feet for 0.8 mile, and thence 1 to 3 feet for 0.3 mile to **Church Creek,** a village near the head.

Other tributaries of Little Choptank River have depths of 2 to 5 feet, and are used by small local boats.

Choptank River (see also chart 12268), which flows into Chesapeake Bay 2 miles eastward of Sharps Island Light, is navigable for 53.4 miles to the town of Greensboro. Traffic on the river consists chiefly of petroleum products, fish and shellfish, shells, grain, soybeans, and fertilizer.

Mileages on Choptank River, such as Mile 8N, 13S, etc., are the nautical miles above the entrance between Blackwalnut Point on the north and Hills Point on the south. The letters N, S, E, or W following the numerals indicate by compass direction the place where each feature is located.

The principal approach to Choptank River is from southward through a buoyed channel commencing 6 miles southward of Sharps Island Light; the controlling depth is about 25 feet. The approach from northward, between designated fishtrap areas, has a least depth of 10 feet.

The Choptank River main channel has depths of 19 to 25 feet to Cambridge, 15 miles above the mouth, thence in 1975, a controlling depth of 5 feet to Denton and a centerline controlling depth of 2 feet to the fixed bridge at Greensboro. The channel is marked as far as Denton.

The mean range of tide is 1.6 feet at Cambridge, 2.2 feet at Denton, and 2.5 feet at Greensboro. The river water is fresh above the town of Choptank. The current velocity is about 0.7 knot in the entrance off Cook Point. In Choptank and Tred Avon Rivers the current velocity is less than 1.0 knot.

Caution.–It has been reported that during the winter many of the buoys marking the main river channel from the entrance to Cambridge may be moved off station due to ice conditions. It has been further reported that several vessels have grounded on the charted 12-foot shoal close westward of the main river channel in (38°37′37″N., 76°08′15″W.), about 0.2 mile southward of Lighted Buoy 18; mariners are advised to give this area a good berth. In 1970, a stake was reported southward of the main river channel in 38°35′47″N., 76°06′34″W., near Mile 11.9.

Two miles above Hills Point, on the south side of the entrance, is shallow **Trippe Bay,** which is little used except by small oyster and fishing boats. The channel to **Brannock Bay** is marked by daybeacons.

Tilghman Island, north of the entrance to Choptank River, has a substantial crabbing, oystering, and fishing industry. The island, 3 miles long in a north-south direction, is subject to rapid erosion on its western side.

Blackwalnut Cove, at the south end of Tilghman Island, is well sheltered except from the south, and is used extensively by small boats. A marked dredged channel leads to a basin at the upper end of the cove. In September-December 1986, the controlling depth was 3½ feet in the channel, with 6 feet in the basin except for shoaling to 3½ feet along the eastern edge. A public pier at the south end of **Fairbank** has depths of 3 feet at the outer end.

Dogwood Harbor, on the eastern side of Tilghman Island, has depths of 7 feet to the packing-plant wharf. A dredged channel in the upper part of Dogwood Harbor leads northwestward from just above the packing-plant wharf to an anchorage basin at Tilghman. In 1982, the midchannel controlling depth was 6 feet, thence in 1980-1982, depths of 5 to 6 feet were in the basin. The mean range of tide is 1.3 feet. Berthing, electricity, ice, and hull and engine repairs are available.

Knapps Narrows, between the mainland and the northern end of Tilghman Island, affords passage from Choptank River to Chesapeake Bay. In December 1986, a controlling depth of 6½ feet at midchannel was available from Choptank River to the highway bridge, thence 4 feet to Chesapeake Bay. **Note** that the system of marking is from each entrance and reverses at the bridge. The highway bridge over the narrows has a bascule span with a clearance of 7 feet. The bridgetender monitors VHF-FM channel 16 and works on channels 13 and 68; call sign KZA-868. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) The mean range of tide is 1.3 feet. The current at the bridge is reported to be 2 knots.

The village of **Tilghman** is on the south side of Knapps Narrows. The bulkheaded sides of the turning basin on the west side of the southerly abutment of the bridge are available for public use. In March 1981, depths of 4 to 7½ feet were available in the basin, except for shoaling to 2 feet

in the northeast corner. A marina and boatyards are on the south side of the narrows.

Harris Creek empties into Choptank River at Mile 2.3N, along the east side of Tilghman Island. The channel has depths of 10 feet, with local knowledge, and is marked as far as Cummings Creek, 5.5 miles above the mouth. Above this point the narrow and crooked channel has depths of 6 feet to the forks, thence 5 feet in a channel marked by private stakes for 1 mile up **Northeast Branch** (chart 12270), and thence 2 feet for 1 mile to the head of the branch, 9 miles above to the mouth of the creek. **Northwest Branch** (chart 12270) also extends 2 miles from the forks, and has a controlling depth of about 2 feet to its head.

Sherwood is a village on the west side of Harris Creek 4.5 miles above the mouth. The county wharf at the village, available for public use, has depths of 3 feet alongside.

Cummings Creek empties into the northwest side of Harris Creek 5.5 miles above the mouth. A depth of about 5 feet can be carried up Cummings Creek to the county wharf at **Wittman** (chart 12270). The larger of two boatyards along the prongs just eastward of Cummings Creek can handle boats up to 40 feet for hull repairs.

Broad Creek, Mile 4.4N, has depths of 16 feet as far as **Edge Creek,** on the east side 3 miles above the mouth. Above Edge Creek, the winding channel has depths of 9 feet for 3 miles, then shoals gradually to depths of 2 feet at the head, 7.5 miles above the entrance. The wide entrance channel is marked, but some local knowledge is needed in the narrow unmarked upper reaches.

Balls Creek, on the west side of Broad Creek 1 mile above the entrance, has depths of 6 to 7 feet almost to its head; the narrow entrance is marked by a light and the channel by daybeacons. **Neavitt** is a village on the southwest side near the head.

Grace Creek, on the west side of Broad Creek 2.3 miles above the entrance, is marked by daybeacons. A marine railway on the south side near the head of the creek can handle boats up to 40 feet.

St. Michaels, a town with its main waterfront on Miles River, can be reached from Choptank River by way of Broad Creek, thence southeastward in Edge Creek for 0.7 mile, and thence northward in **San Domingo Creek** for 2.3 miles to its head, 6 miles from the mouth of Broad Creek. San Domingo Creek has depths of 7 feet or more for most of its length, and a controlling depth of 4 feet to St. Michaels. In August 1978, shoaling to an unknown extent was reported in 38°45′45″N., 76°13′52″W. The channel is marked by daybeacons.

Irish Creek, Mile 4.7N, has depths of 7 feet for 1.4 miles, then shoals gradually to 2 feet at its head, 2 miles above the entrance. In August 1980, shoaling to 2 feet was reported in the channel between Daybeacons 3 and 4 in about 38°41′35″N., 76°13′24″W., and 38°41′47″N., 76°13′25″W. The narrow approach channel is marked by buoys and daybeacons. The creek is used only by small local boats.

Tred Avon River, Mile 7.9N, has natural depths of 16 feet or more for 5 miles, thence 11 feet for 1 mile to **Peachblossom Creek,** and thence about 8 feet to Easton Point, 8.5 miles above the mouth. The channel is marked as far as Easton Point. Shoals extend off **Watermelon Point,** on the east side 7 miles above the mouth; above this point midchannel courses can be steered. Caution should be exercised if going beyond Easton Point because of abrupt shoaling. The mean range of tide is 1.6 feet. Traffic in the river consists chiefly of petroleum products, shellfish, and pleasure craft.

Choptank River Light (38°39.4′N., 76°11.1′W.), 35 feet above the water, is shown from a skeleton tower with small white house on piles in depths of 16 feet 0.6 mile outside the entrance to Tred Avon River.

Small motorboats can find anchorage near midchannel of any of the larger tributaries of Tred Avon River. The river bottom is quite firm, but the bottom in the tributaries is mostly soft mud. There is usually excellent protection from the wind; the brush and trees that line most of the banks provide some protection.

Oxford is on the east side of Tred Avon River, 2 miles above the mouth. The principal facilities are along Town Creek on the east side of the town. A marina is on the river side 2 miles above Choptank River Light; the marked entrance channel has a controlling depth of about 4 feet. The ferry landing on the river side of Oxford has depths of 14 feet at the face. Year-round ferry service is maintained to Bellevue, on the opposite side of the river. A public landing nearby has fuel.

Town Creek enters Tred Avon River east of Oxford and comprises the waterfront area of the town. A marked dredged channel leads from the entrance to a turning basin at the head of the creek. In 1972, the controlling depths were 5½ feet in the channel and 5 feet in the turning basin. Two anchorage basins, off the west side of the channel, 0.3 mile and 0.5 mile above the entrance, had in 1972, depths of 10 feet and 8 feet, respectively. In 1982, it was reported that the holding quality of the bottom in Town Creek was excellent. The range of tide is 1.4 feet.

The several packing houses have wharves along the west bank of Town Creek, and small piers are scattered on both sides.

Bellevue, across the river from Oxford, is the site of several oyster-packing plants in ruins but prominent as landmarks. A municipal mooring basin is immediately north of the ferry landing.

Easton Point, at the head of Tred Avon River 8.5 miles above the mouth at the junction of **North Fork** and **Papermill Pond,** is 1 mile west of **Easton.** A public wharf and the wharves of the oil terminals are on the point. A marina here has gasoline, diesel fuel, some supplies and slips. A 12-ton lift can haul out boats for repairs.

Island Creek, Mile 8.3E, is entered on the north side of Choptank River through a bar channel marked by a light and a daybeacon. In 1982, the bar channel had a controlling depth of 4½ feet.

Lecompte Bay, Mile 10.0S, has depths of 7 to 13 feet. A narrow channel, marked at the entrance by private daybeacons, has a controlling depth of about 4 feet and leads to a boatyard 0.5 mile inside **Lecompte Creek** on the west side of the bay. A marine railway can haul out boats up to 50 feet for repairs.

La Trappe Creek, Mile 10.6N, has depths of 10 feet for 0.5 mile, thence 5 feet to the bulkhead at **Trappe Landing,** 3 miles above the mouth. The entrance is marked.

Cambridge, Mile 15.2S, is the center of a large agricultural area with related industries serving the Delmarva Peninsula. Waterborne commerce consists chiefly of frozen fish, shellfish, petroleum products, grains, and road construction materials. The town has bus, railroad freight and truck services. An airport is near the town.

A marked channel from deep water in Choptank River to a turning basin at the entrance to **Cambridge Creek** had, in May 1979, a controlling depth of 24 feet; thence depths of 20 to 25 feet were available throughout the turning basin to the **Cambridge Marine Terminal** on the south side and the entrance to Cambridge Creek on the northwest side. The dredged channel through Cambridge Creek had, in June 1984, a controlling depth of 12 feet to the highway bridge, thence 9½ feet to the head about 0.7 mile above the

entrance; depths of 8 to 10 feet were available in the anchorage basins on each side of the channel about 0.2 mile inside the entrance.

Most of the waterfront facilities inside the creek have depths of 8 to 12 feet alongside. The mean range of tide is 1.6 feet. The State Route 343 highway bridge 0.3 mile above the harbor entrance has a bascule span with a clearance of 8 feet. The bridgetender monitors VHF-FM channel 16 and works on channels 13 and 68; call sign KZA-695. (See **117.1 through 117.59 and 117.549,** chapter 2, for drawbridge regulations.)

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Cambridge is a **customs port of entry.**

The Cambridge Marine Terminal, under a port superintendent, is owned and operated by the Maryland Port Administration as a public facility. The 500-foot marginal wharf at the terminal provides an additional 150 feet of berthing space by a catwalk and two mooring dolphins; depths of 25 feet are reported alongside. Vessels usually moor portside-to for easier undocking. The terminal has rail and highway connections, a 16,000-square-foot warehouse, and 6 acres of open storage. Water is piped to the wharf.

Fuel and supplies can be obtained at Cambridge. The largest shipyard has a marine railway that can handle vessels up to 75 feet for hull and engine repairs; a 35-ton mobile hoist is also available. An unmarked channel with a reported centerline controlling depth of 8 feet, in February 1981, leads from Choptank River to the municipal boat basin just westward of Cambridge Creek; the basin has reported depths of 4 to 7 feet. Gasoline, electricity, water, and ice are available. The Cambridge Yacht Club is on the north side of the basin.

Chart 12268.–The highway bridge over Choptank River at the southeast side of Cambridge, Mile 15.5, has a swing span with a clearance of 18 feet. The bridgetender monitors VHF-FM channel 16 and works on channels 13 and 68; call sign KYQ-894. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) In March 1985, a fixed highway bridge with a design clearance of 45 feet was under construction just northwest of the swing bridge; upon completion, it will replace the existing bridge.

Warwick River, Mile 20.4E, is entered through a marked dredged channel which leads to the bulkhead wharves at **Secretary,** 1 mile above the entrance. In April-June 1975, the channel had a centerline controlling depth of 5 feet. Gasoline is available. A marine railway on the south side of the entrance to the river can haul out boats up to 60 feet for repairs; gasoline is available.

Cabin Creek, Mile 22.6E, has depths of 3 feet to the fixed highway bridge 1 mile above the entrance, thence 2 feet for 0.5 mile nearly to the head. Private daybeacons mark the creek to below the bridge. The bridge has a width of 17 feet and a clearance of 7 feet. Gasoline and minor repairs are available at a small marina just below the bridge.

Hunting Creek at Mile 25.2E has depths of 3 feet for 3 miles to a fixed highway bridge. The fixed highway bridge 0.4 mile above the entrance has a width of 17 feet and a clearance of 7 feet.

Choptank is a village at Mile 25.6N. The small yacht harbor at Choptank has depths of 2 to 3 feet behind its wooden bulkheads. A 6 mph, no-wake **speed limit** is enforced. Gasoline is available.

The overhead power cable at Mile 30.7 has a clearance of 139 feet.

Dover Bridge, Mile 33.0, has a swing span with a clearance of 10 feet. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.)

Tuckahoe Creek is at Mile 39.5N. The channel in the creek has depths of 8 feet for 2.7 miles, thence 5 feet for 6 miles, and thence less than a foot to the fixed highway bridge from **Hillsboro** to **Queen Anne,** at the head of navigation 11 miles above the entrance. **Tuckahoe Bridge,** 1.7 miles above the entrance, has a 40-foot fixed span with a clearance of 17 feet. The channel is unmarked, crooked, and difficult to navigate in places without local knowledge. The flats are covered with tuckahoes or marsh grass in the summer. The creek is used only by small fishing and pleasure boats. The overhead power and telephone cables just north of the bridge have a clearance of 25 feet. The overhead power cable across the creek about 6 miles above the mouth has a clearance of 32 feet.

Williston is a small settlement with a bulkhead landing at Mile 42.0E.

Choptank River is constricted by **Pealiquor Shoal** at Mile 44.3. A dredged channel through the shoal area, in October 1977, had a centerline controlling depth of 5½ feet.

Denton is a town at Mile 46.6E. The highway bridge over the river here has a fixed span with a clearance of 25 feet. A bascule bridge with a clearance of 4 feet is just above the fixed bridge; in November 1980, the bridge was being maintained in the open position. The railroad bridge 0.4 mile above the highway bridge has a swing span with a clearance of 6 feet. (See **117.1 through 117.59 and 117.553,** chapter 2, for drawbridge regulations.) In 1981, a fixed highway bridge with a design clearance of 25 feet was under construction about 0.4 mile above the railroad bridge. The least clearance of the overhead power cables crossing Choptank River at Denton and above is 47 feet.

Greensboro is a town at the head of navigation at Mile 53.4W. In April-June 1975, the centerline controlling depth in the dredged channel above Denton was 2 feet to the bridge at Greensboro. The fixed highway bridge at Greensboro has a width of 37 feet and a clearance of 10 feet. Gasoline and some marine supplies can be obtained in town.

Chart 12270.–Eastern Bay, the approach to Claiborne, St. Michaels, Miles River, and other tributaries, is entered between the southerly tip of Kent Island and the northerly end of Poplar Island, 2.2 miles southward.

The shores are low and have few prominent marks. Light-draft vessels also can enter from southward through Poplar Island Narrows and from Chester River on the north by way of Kent Island Narrows.

Bloody Point Bar Light (38°50.0′ N., 76°23.5′ W.), 54 feet above the water, is shown from a brown tower on cylindrical foundation in 7 feet a mile westward of the south end of Kent Island. A seasonal fog signal is at the light which is 1 mile due east of a point on the main ship channel 120.2 miles above the Virginia Capes.

The bay is used extensively by oystermen and fishing craft, as well as by increasing numbers of pleasure craft. The channel is wide and deep; within the bay are large shoal areas, but depths of 25 feet can be taken without difficulty to the mouths of most of the tributaries.

Currents.–East of Poplar Island the current velocity is 1.0 knot on the flood and 0.6 knot on the ebb. Throughout Eastern Bay the current velocity is less than 1.0 knot.

Poplar Island, on the south side of the main entrance, is 1.3 miles long in a north-south direction, and is low and wooded. Smaller **Jefferson Island,** southeast of the northern

part of Poplar Island, and **Coaches Island,** east-southeast of the southern end, once were part of the large island. **Poplar Harbor,** formed by the three islands, has secure anchorage in depths of 4 to 6 feet.

Poplar Island Narrows has a least width of 1 mile between Coaches Island and the mainland to the eastward. The channel through the narrows is marked. In July 1970, shoaling to 5½ feet was reported in the southern entrance to the narrows in about 38°44′03″N., 76°21′17″W.

Ferry Cove, on the mainland side of Poplar Island Narrows, is entered through a marked dredged channel which leads to a turning basin on the south side of **Lowes Wharf** at the head. In September 1981, the controlling depth from the entrance to the turning basin was 4½ feet, thence, a depth of 3 to 3½ feet was in the west half of the basin; the east half had shoaled to bare. Gasoline is available at the shellfish company pier.

Claiborne is a village on the southeast side of Eastern Bay 5 miles by deep channel from the main entrance. A combination pier and jetty extends 0.2 mile west-southwestward from the Claiborne waterfront; the pier is in ruins. The former ferry landing is just south of the old pier. The channel to Claiborne, marked by a light and private buoys, had a controlling depth of 5 feet in April 1987. Depths of about 5 feet are available in the basin. Gasoline and some supplies can be obtained in the village.

Kent Point, the northerly entrance point of Eastern Bay, is the southernmost extremity of **Kent Island,** which has a north-south length of 12.5 miles and a greatest width of 5.5 miles.

Cox Creek flows southward from the interior of Kent Island into Eastern Bay between **Long Point,** 2 miles northeast of Kent Point, and **Turkey Point,** 3 miles farther to the northeastward. The channel has depths of 22 feet for 1.5 miles, thence 11 feet for 2 miles, thence 7 feet for 2 more miles, and then shoals gradually to 2 feet at the head of navigation, a fixed highway bridge 6.5 miles above the mouth.

A landing at **Romancoke,** 1.5 miles northward of Long Point, has depths of about 4 feet off its end, but is in poor condition. Above Romancoke, Cox Creek has no villages on its shores and is used mostly by oyster boats. The channel is very narrow in places, and shallow water is close to the edges. The shoals are unmarked, and local knowledge is needed to avoid them.

Crab Alley Bay joins Eastern Bay between **Bodkin Island,** 0.8 mile east-southeastward of Turkey Point, and **Parson Island,** 2 miles eastward of Turkey Point. Bodkin Island is very small and thickly wooded. Larger Parson Island is sparsely wooded and has a ragged appearance.

Crab Alley Bay is 8 miles by deep channel from the Eastern Bay main entrance. The principal channel in Crab Alley Bay is marked and has depths of 8 feet for 2.5 miles to Crab Alley Creek, in the northwestern part of the bay.

The mouth of **Crab Alley Creek,** between **Cox Neck** on the west and **Johnson Island** on the east, is partly obstructed by very shallow areas that extend out from both sides. The channel within the creek has depths of 6 feet for 1 mile, then shoals gradually to 1 foot at the head. In July 1978, shoaling to an unknown extent was reported on the west side of Johnson Island in about 38°55.8′N., 76°17.6′W. A boatyard is on the east side of the creek just north of Johnson Island. Supplies are available. A marine railway at the boatyard can handle craft up to 65 feet; hull and engine repairs can be made.

Little Creek, northeast of Johnson Island, is entered through a marked dredged channel which leads to a basin about halfway up the creek. In August 1985, the channel had a reported centerline controlling depth of 3 feet. In 1969, 7 feet was in the basin. The largest marine railway on the creek can haul out boats up to 55 feet for hull and engine repairs; gasoline, water, some marine supplies, berths, and a 2-ton lift are available.

Prospect Bay, in the northeastern part of Eastern Bay, is entered between Parson Island and **Piney Neck Point,** 2 miles to the east-southeastward. The entrance is 9 miles by deep channel from the main Eastern Bay entrance.

Prospect Bay extends northward for 5 miles to the U.S. Route 50/301 highway bridge over Kent Island Narrows. The channel has natural depths of 21 feet for 2 miles, thence 11 feet for 1 mile, and thence 7 feet to the beginning of the marked approach to the narrows, which is described later in connection with Chester River. A **000°-180° measured course,** 0.5 mile long, is 1.2 miles north-northwestward of Piney Neck Point. The course is marked by private seasonal buoys.

A **special anchorage** is in **Cabin Creek** on the northeast side of Prospect Bay. (See **110.1 and 110.71a,** chapter 2, for limits and regulations.)

Greenwood Creek, entered on the southeast side of Piney Neck Point east of Prospect Bay entrance, has depths of 5 feet for nearly 3 miles inside, but only about 3 feet can be taken over the bar.

Miles River flows into the eastern part of Eastern Bay from southeastward, between **Tilghman Point,** at the northeastern end of **Rich Neck,** and **Bennett Point,** 2.3 miles east-southeastward. The entrance is 8.5 miles by deep channel from the main entrance to the bay.

Miles River channel has depths of 20 feet or more for 6 miles, thence 10 feet to the highway bridge 11 miles above the mouth, and lesser depths to the head 14.5 miles above the mouth. A shallow **middle ground,** about 2 miles above the entrance, bares in one place at low water, but is well marked on all sides by buoys and a daybeacon; the river channel is marked as far as the bridge. The small trade on the river is chiefly in shellfish and shells.

Tilghman Creek is on the west side of the entrance along the southeast side of Tilghman Point and Rich Neck. The outer end of Tilghman Point is heavily wooded. The narrow entrance, marked by a light and daybeacons, has depths of about 8 feet; depths of 11 to 8 feet are inside the creek for the remainder of its 1-mile length. A vessel must stay in midchannel to carry the best water. At the upper end of the creek, slips are available at a county wharf; depths of about 6 feet are reported alongside. A marine railway can handle boats up to 40 feet for hull and engine repairs.

Wye River flows into the east side of Miles River entrance, just inside **Bennett Point.** The approach can be made either around the middle ground or to the north of it. The northerly approach is shorter by 2 miles, but is limited to depths of 9 feet; the southerly encircling approach has depths of 30 feet or more. Both approaches are marked.

Small local boats are the principal users of Wye River and its several branches. The twisting channels, some partially marked by private daybeacons, require local knowledge. The channel in the river proper has depths of 30 feet or more for 2 miles, thence 10 feet for 4 miles, thence 6 feet for 1.5 miles and shoaler depths, thence to the head 9.5 miles above the mouth. Oyster bars are along the channel edges in the vicinity of **Wye Island.** There are several landings along the river and its branches.

A **special anchorage** is in a small cove along the western side of Wye River, opposite **Drum Point.** (See **110.1 and 110.71b,** chapter 2, for limits and regulations.)

Wye Narrows, which branches eastward 4 miles above the mouth of Wye River, follows the north side of Wye

Island for 4 miles to its junction with **Wye East River.** The channel through the narrows has a controlling depth of 6 feet. Midway along the narrows is a fixed highway bridge with a width of 40 feet and a clearance of 10 feet. An overhead power cable with a clearance of 32 feet crosses the narrows close eastward of the bridge.

Long Haul Creek, on the west side of Miles River 5 miles above the entrance, has depths of 9 feet or more in most of its 0.6-mile length. The Miles River Yacht Club maintains the **285°** range that marks the channel into the small club harbor in the creek. The range is lighted from April through November and reportedly cannot be seen in daylight.

St. Michaels, a town at the head of a small harbor on the west side of Miles River 6 miles above the entrance, has a marked entrance with depths of more than 10 feet. In March 1983, the harbor had depths of 7 to 10 feet in the middle with lesser depths towards the shores, thence a controlling depth of 5 feet was in the channel leading southward from the head of the harbor to a basin with depths of 3 to 5½ feet at the end of the channel. The mean range of tide is 1.2 feet.

The **Chesapeake Bay Maritime Museum** is at St. Michaels.

Small-craft supplies, gasoline, diesel fuel, and slips are available at St. Michaels. Largest haul-out equipment for repairs is a 30-ton lift.

Leeds Creek, marked at the entrance by a daybeacon, is directly across Miles River from St. Michaels. **Fairview Point,** on the north side of the entrance, is thickly wooded. The creek has depths of 5 feet for 2 miles to the village of **Tunis Mills,** then shoals gradually to 3 feet at the head, 0.5 mile farther up. In 1972, shoaling to an unknown extent was reported in Leeds Creek in about 38°47′56″N., 76°11′39.5″W. and 38°48′05″N., 76°11′35.5″W. The fixed highway bridge from Tunis Mills to **Copperville,** on the northwest side of the creek, has a width of 19 feet and a clearance of 6 feet. An overhead power cable just below the bridge has a clearance of 18 feet.

Oak Creek, on the south side of Miles River 8 miles above the entrance, is privately marked by daybeacons and has depths of 2 feet in the mouth, thence 3 to 5 feet for about 0.6 mile to the village of **Royal Oak** at the head of the creek. The fixed highway bridge at the entrance has a width and clearance of 24 feet. Overhead power cables just southward of the bridge have clearances of 40 feet. Above the wharves at **Newcomb,** on the west side just above the bridges, the creek is obstructed by grass.

Hunting Creek, directly across Miles River from Oak Creek, has depths of 5 feet for 2.5 miles. The peninsula on the west side of lower Hunting Creek has a breakthrough with a depth of 3 feet, 0.8 mile above the entrance.

The highway bridge over Miles River 11 miles above the entrance has a 34-foot bascule span with a clearance of 5 feet. (See **117.1 through 117.59 and 117.565,** chapter 2, for drawbridge regulations.)

The Chesapeake Bay shore of Kent Island is low and wooded. Marinas 3.8 and 4.8 miles north of Kent Point can provide supplies, gasoline, diesel fuel, and slips. In September 1980, the reported controlling depths were 3 feet to the northerly marina and 1 foot to the southerly marina. Both entrances are protected by jetties. It is reported that submerged pilings are at the ends of the jetties protecting the southerly marina. The northerly marina has a marine railway that can handle boats up to 55 feet for hull and engine repairs; a 35-ton lift is also available.

A **001°30′–181° 30′ measured nautical mile** is off **Brickhouse Bar,** 5 miles north of Kent Point and 1 mile west of Kent Island; buoys and shore ranges mark the course.

Matapeake, 7 miles north of Kent Point, is the site of a former ferry terminal. The jettied entrance channel has a controlling depth of about 7 feet leading to a pier of the Maryland Marine Police. The waters inside the jetties are available as a State harbor of refuge in an emergency; no services are available.

A marina, 1.7 miles north-northeast of Matapeake, is entered through a privately dredged channel marked by private buoys, daybeacons, markers, and a lighted range. In September 1980, the channel had a reported controlling depth of 5 feet. Gasoline, diesel fuel, and limited supplies are available. Repairs can be made; mobile lift, 60 tons. The William P. Lane, Jr. Memorial (Chesapeake Bay) Bridge, 9 miles north of Kent Point, is described in chapter 13.

Chart 12272.–Love Point Light (39°03.4′N., 76°17.0′W.), 35 feet above the water, is shown from a skeleton tower, with a red and white diamond-shaped daymark, 1.4 miles northeast of Love Point; a seasonal fog signal is at the light.

The main entrance to **Chester River** is between **Love Point,** the northern end of Kent Island, and Eastern Neck Island, 3 miles to the eastward. The approach is northward and eastward of Love Point Light.

A fish haven, marked by a buoy, is in the approach to Chester River about 0.8 mile north-northwest of Love Point Light.

Light-draft vessels can also enter from Eastern Bay and Miles River on the southward by way of Kent Island Narrows. Traffic on the river consists chiefly of petroleum products and shellfish.

Mileages on Chester River are designated Mile 7S, 11W, etc., which are the nautical miles above the entrance. The letters N, S, E, or W, following the numerals indicate the side of the river by compass point direction where each feature is located.

Chester River has channel depths of 13 feet or more to Chestertown, thence 7 feet to Crumpton, and thence 5 feet to Kirby Landing, Mile 35.2S. The channel is marked for about 32 miles to Crumpton. Above Chestertown, deepest water is difficult to follow except with local knowledge and extreme caution.

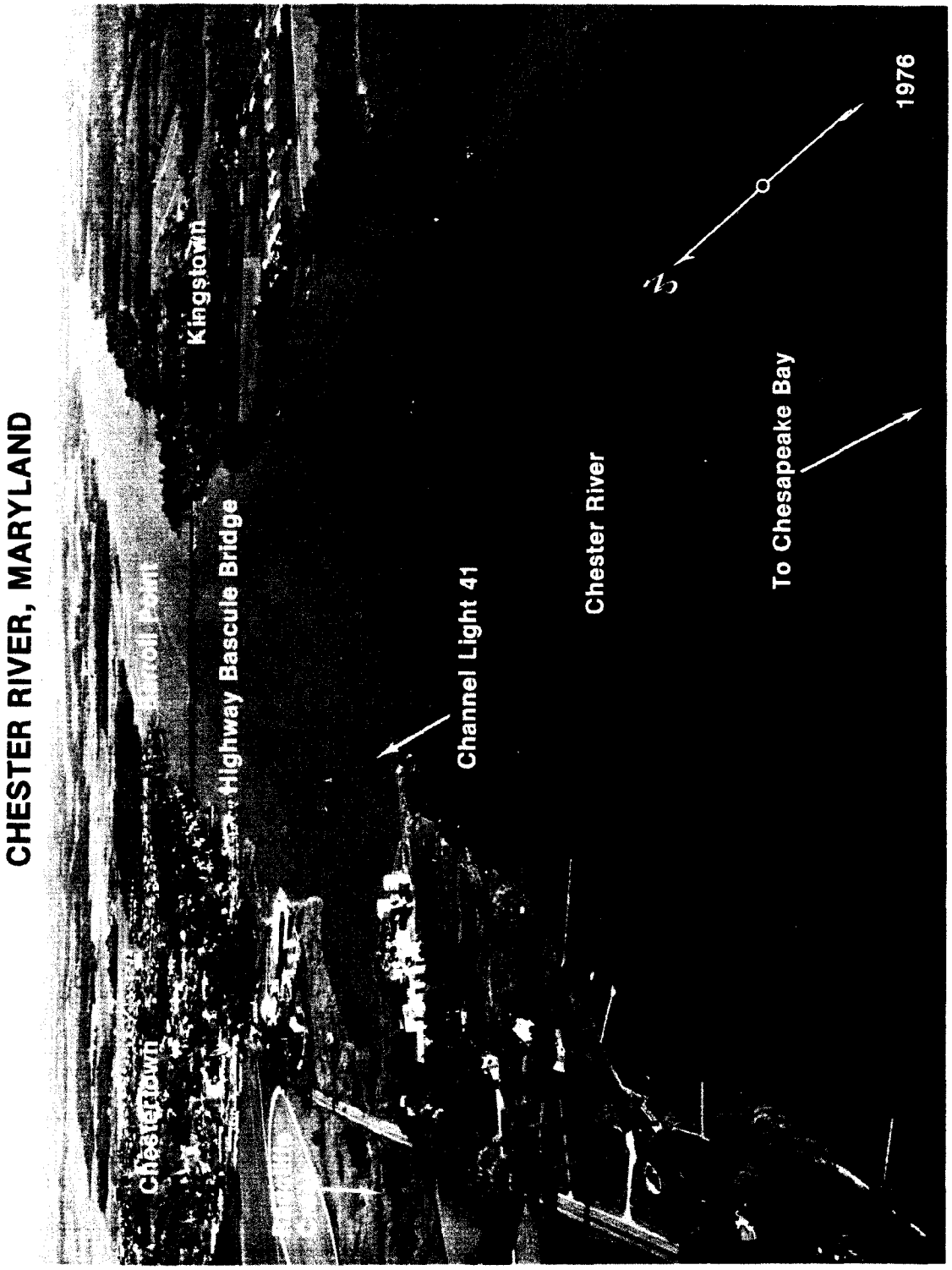
The mean range of tide in Chester River is 1.1 feet at the entrance, 1.3 feet at Queenstown, 1.8 feet at Chestertown, and 2.4 feet at Crumpton. The current velocity is less than 1.0 knot. The river is usually closed to navigation by ice for extended periods during ordinary winters; in mild winters the channel is kept clear most of the time by powerboats. The river water is fresh above Chestertown.

Love Point is a village on the point on the west side of the entrance to Chester River. Shells are received by barge at the old railroad pier on the river side of the village.

Eastern Neck Island, on the east side of the entrance, is about 3 miles long in a northwest-southeast direction. The island is sparsely wooded with extensive grassy flats along the south shore. It is connected with the mainland on the north by a fixed highway bridge, reported clearance of 6 feet, over **Eastern Neck Narrows,** which is very narrow and little used.

At Mile 2.7S, a privately marked channel leads to a basin with a marina on its south side. In March 1979, the controlling depth was reported to be 5 feet in the channel and the basin. Gasoline, diesel fuel, some marine supplies, and berths are available. Hull and engine repairs can be made; a 30-ton mobile hoist is available.

Kent Island Narrows entrance is at Mile 4.0S. A marked channel, with a dredged section, leads from Chester River to Eastern Bay; the chart is the guide. In June 1981, the controlling depth was 6½ feet for a midwidth of 60 feet.


CHESTER RIVER, MARYLAND
Chestertown
Carroll Point
Kingstown
Highway Bascule Bridge
Channel Light 41
Chester River
To Chesapeake Bay
1976

Very heavy traffic can be expected through the channel during the summer months, especially on weekends. **Note well** that the system of marking is continuous from Eastern Bay to Chester River; if entering the narrows from Chester River, odd numbers are on the right and even numbers on the left.

The State Route 50/301 highway bridge over the narrows has a 48-foot bascule span with a clearance of 18 feet. The bridgetender monitors VHF-FM channel 16 and works on channels 13 and 68; call sign KXE-254. (See **117.1 through 117.59 and 117.561**, chapter 2, for drawbridge regulations.) The nearby overhead power cable has a clearance of 85 feet. Temporary mooring areas for vessels awaiting bridge openings have been established by the State of Maryland on the west side of the channel about 50 yards north of the bridge, and 100 yards and 650 yards south of the bridge. The current velocity is 1.0 knot on the flood and 0.9 knot on the ebb at the bridge.

Two detached nearly parallel breakwaters, 700 and 1,500 feet long in a northwest-southeast direction, are about 0.3 mile southward of the highway bridge crossing the narrows and about 0.1 mile southwestward of the channel entrance to Wells Cove.

Wells Cove, on the east side of the narrows 0.4 mile southeast of the bridge, has general depths of 1 to 5 feet. A marked dredged channel leads to a basin in the cove; in 1966, the controlling depths were 6 feet in the channel and basin.

Many crab and oysterhouse piers are along Kent Island Narrows and on the north side of Wells Cove. Complete small-craft facilities are also available in this area.

Jackson Creek, Mile 5S, has depths of 2 to 7 feet at the entrance and is used as an anchorage by oyster boats; the channel is marked. The bottom is covered with grass.

Queenstown Creek, Mile 6.1E, is entered through a marked channel which leads to a turning basin at **Queenstown,** on the southeast side of **Little Queenstown Creek.** In March 1983, 7 feet was available, with local knowledge, in the entrance channel, thence controlling depths of 6½ feet were in the channel in Little Queenstown Creek and in the turning basin. In March 1983, the west half of the entrance channel, between Light 3 and Light 5, had shoaled to 1 foot. The entrance channel is bordered by very shallow grassy flats.

Grays Inn Creek, Mile 10.7W, has depths of 8 feet for 2.3 miles to a small settlement on the west side, then shoals gradually to 1 foot. About 1.8 miles above the mouth, a marina on **Skinners Neck** has a marine railway that can haul out craft up to 45 feet for repairs; gasoline is available.

Langford Creek, Mile 11.3N., has depths of 12 feet over the bar and deeper water inside to the forks 1.7 miles above the mouth; the channel is buoyed to **Drum Point.** An unmarked shoal extends southwestward from small **Cacaway Island** toward the junction of the two fork channels; above the shoal the unmarked forks are clear in midchannel. **East Fork** has depths of 10 feet for 3 miles, thence 7 feet for 1 mile to within 1 mile of the head. **West Fork** has depths of 8 feet for about 3 miles, thence 6 feet for 0.7 mile.

Long Cove, on the west side of Langford Creek 0.7 mile above the mouth, has depths of 4 feet to the head; the entrance is marked. The largest marine railway in the cove can haul out boats up to 50 feet for repairs; some supplies and gasoline are available.

Davis Creek, on the west side of Langford Creek 1.5 miles above the mouth, has depths of 9 feet to a marina on the south side near the entrance. A private daybeacon marks the entrance to the creek. Gasoline, diesel fuel, and supplies are available. Repairs can be made; a 25-ton lift and a marine railway that can handle craft up to 45 feet are available.

The common entrance to **Reed Creek** and **Grove Creek** at Mile 10.7E is marked by two buoys. The channel to the fork 0.3 mile above the common mouth has a depth of 6 feet. In June 1984, a shoal was reported encroaching the channel from eastward about midway between Buoys 1 and 2. Reed Creek extends southeastward and has depths of 7 feet for about 0.6 mile above the fork, then shoals gradually to 1 foot 1 mile farther up. The channel in Grove Creek is only about 60 feet wide 0.3 mile above the fork, but has depths of 3 feet through the narrows and 5 feet for a mile above that.

Corsica River is at Mile 11.9E. The controlling depth to the public wharf at **Centreville Landing,** 5 miles above the mouth, was reported to be 5 feet on the centerline in 1980. The lower part of the river is marked, but it is difficult to stay in the upper channel without local knowledge. Some supplies and gasoline can be obtained at Centreville, 0.5 mile inland of the landing. The main wharf at the landing is in poor condition, but a smaller wharf is available.

Southeast Creek, Mile 19.8S has depths of 4 feet for 1.8 miles, then shoals to 1 foot at the head of navigation 0.4 mile farther up. **Island Creek,** which empties into the south side of Southeast Creek, 0.5 mile above the mouth, has depths of 3½ feet in the entrance and 4 feet or more for 2 miles to a fixed highway bridge. Both creeks are marked by bush stakes in the difficult reaches. Private buoys mark a channel leading to **Kennersley Wharf,** on the east side of Island Creek 0.3 mile above the entrance; in September 1980, the reported controlling depth was 4½ feet. Gasoline and some supplies are available; a 15-ton mobile lift can handle boats for repairs.

A marina is at **Rolphs,** Mile 20.7E. Some supplies, gasoline, and slips are available. Repairs can be made; lift, 9 tons.

A **special anchorage** is in the Chester River southeast of Chestertown. (See **110.1** and **110.72a,** chapter 2, for limits and regulations.)

Chestertown, Mile 23.8W, is a county seat and has bus and rail transportation. Water commerce consists chiefly of barged petroleum products.

The highway bridge over the river at Chestertown has a bascule span with a clearance of 12 feet. (See **117.1 through 117.59 and 117.551,** chapter 2, for drawbridge regulations.) The county wharf 0.1 mile below the bridge has depths of 5 feet reported alongside. The wharf at the marina 0.2 mile below the bridge has depths of 14 feet at the outer end and 6 feet at the inner face. Supplies, gasoline, diesel fuel, and slips are available. A marine railway can haul out boats up to 40 feet for minor repairs.

Between Chestertown and Crumpton the channel is very narrow in places. Though marked in the more critical places, it is diffcult to navigate without local knowledge and is more easily followed at low water.

Morgan Creek, Mile 25.7N, in October 1979, had reported depths of 2 to 3 feet over the bar at the entrance and 2 to 5 feet for about 2 miles in a narrow crooked channel. The entrance is a narrow slough between flats almost awash at low water. A fixed highway bridge 0.6 mile above the entrance has a clearance of 8 feet. The overhead power cable close northward of the bridge has a clearance of 32 feet.

A public wharf is at **Deep Landing,** Mile 30S. **Crumpton** is at Mile 32S. The highway bridge at the town has a 40-foot fixed span with a clearance of 14 feet. The overhead power cable on the east side of the bridge has a clearance of 28 feet.

Above Crumpton, the channel in Chester River is difficult to follow without local knowledge, but navigation is possible to Jones Landing, at about Mile 37S.

Rock Hall Harbor, north of the entrance to Chester River and 5 miles north-northeastward of Love Point Light, is a base for a large fishing fleet. Traffic in the harbor consists chiefly of fish, shellfish, and shells. The entrance channel leads north between converging breakwaters to an anchorage basin at the west end of the harbor, thence the channel leads eastward paralleling the waterfront to a basin at the east end of the harbor. In May 1982, the controlling depth was 7 feet to the anchorage basin, thence in 1980, 5½ to 8 feet was available in the basin, thence in 1980-May 1982, 7½ feet to the east basin, with 7 to 10 feet in the basin. An unmarked channel with a reported controlling depth of 8 feet leads northeast from inside the entrance and connects with the channel paralleling the waterfront; this channel is no longer maintained.

In October 1984, a submerged obstruction, covered about 4 feet, was reported in the middle of the channel just west of the east basin in about 39°07′57″N., 76°14′31″W.

The approach to Rock Hall Harbor is from southward, between **Swan Point Bar** and the mainland on a **349°** lighted range. The entrance channel and the channels inside the jetties are marked by a buoy, lights, and daybeacons. A seasonal fog signal is at the light on the west side of the entrance channel. In March 1982, a 400-foot extension was being added to the west jetty. In 1980, depths at the packing house and fish wharves in Rock Hall Harbor were 5 to 9 feet.

Numerous small-craft facilities are in Rock Hall Harbor.

Swan Creek is 1 mile northwestward of Rock Hall Harbor and 0.7 mile southeastward of **Swan Point,** which is 139 miles above the Virginia Capes. The creek channel has depths of 7 feet for 1 mile above **Little Neck Island,** on the west side of the entrance, then shoals to 1 foot at the head of navigation 2.3 miles above the entrance.

The shallow flats that extend 0.4 mile south-southeastward from Little Neck Island are marked by a buoy. The approach to Swan Creek is made on the **349°** lighted range used for Rock Hall Harbor.

Several small-craft facilities are at **Gratitude,** 0.5 mile above the entrance to Swan Creek. The area in Swan Creek just north of **Deep Landing** and **The Haven,** a cove 0.5 mile east of Deep Landing, provides a good small-boat refuge in heavy weather.

The eastern shore of Chesapeake Bay above Swan Point is described in Chapter 15.

15. BALTIMORE TO HEAD OF CHESAPEAKE BAY

This chapter describes the northern part of Chesapeake Bay and the many tributaries that empty into it, including the more important Patapsco, Elk, and Susquehanna Rivers. Also described is the major port of Baltimore and several smaller ports and landings in this part of the bay.

COLREGS Demarcation Lines.–The lines established for Chesapeake Bay are described in **80.510,** chapter 2.

Chart 12273.–Patapsco River forms Baltimore Harbor, and Elk River is the approach to the Chesapeake and Delaware Canal. The other tributaries that empty into this part of the bay are seldom used by vessels drawing more than 12 feet. The shores are mostly wooded in the undeveloped areas and rise to considerable heights in the vicinity of Northeast and Susquehanna Rivers.

There are extensive shoal areas in the upper part of the bay, and **fishtraps** are numerous in season; fishtrap limits are shown on the chart. All of the tributaries are usually closed by ice for extended periods during the winter.

Chart 12278.–Sandy Point Shoal Light and Baltimore Light, respectively 131.5 and 134.2 miles above the Virginia Capes, were described in chapter 13. The channel to Baltimore and the channel to the head of Chesapeake Bay divide at 0.5 mile eastward of Sandy Point Shoal Light.

Sevenfoot Knoll Light (39°09.3′N., 76°24.5′ W.), 42 feet above the water, is shown from a red cylindrical pile structure on the northeast side of the channel to Baltimore, 140.1 miles from the Capes.

Caution.–Large vessels transiting Craighill Channel Upper Range and Brewerton Channel Eastern Extension in the vicinity of Sevenfoot Knoll Light may generate large and dangerous wakes; waves as high as 10 to 12 feet have been reported. Small craft in the area are advised to use extreme caution.

Baltimore Harbor consists of the entire Patapsco River and its tributaries; a part of the waterfront thus included lies outside the municipal limits of Baltimore, but by State law is within the jurisdiction of the Maryland Port Administration.

Patapsco River joins the west side of Chesapeake Bay between Bodkin Point and **North Point,** 4 miles to the northward; the midchannel point in the entrance, 2 miles northwest of Sevenfoot Knoll Light, is 142.1 miles above the Virginia Capes, and 54 miles from Delaware River by way of the Chesapeake and Delaware Canal.

Channels.–Federal project depths are: 42 feet in the main channel between the Virginia Capes and Fort McHenry, Baltimore; 35 feet in the main channel between the Delaware Capes and Baltimore via the Chesapeake and Delaware Canal; 42 feet in Curtis Bay Channel; 42 feet in Ferry Bar Channel (east section) to the channel leading to the Port Covington yard; 39 feet in East Channel of Northwest Harbor; and 35 feet in West Channel of Northwest Harbor.

The channels are maintained at or near project depths. (See Notice to Mariners and latest editions of the charts for controlling depths.)

Bodkin Point is the low northeastern extremity of **Bodkin Neck,** on the south side of the entrance to Patapsco River. Shoals extend northward and eastward from the point to the edge of the main channel.

Bodkin Creek, which flows into Patapsco River along the inner side of Bodkin Neck, has depths of 9 feet in the approaches and 7 to 9 feet for considerable distances into its branches. The channel is very narrow at the mouth and leads between extensive shoals. Shoaling to 3 feet is reported in the entrance to the creek between Daybeacon 9 and Light 11; mariners are urged to use caution in this area.

Back Creek is on the northeast side of Bodkin Creek just inside the mouth. A boatyard is in the upper part of the creek. Gasoline and slips are available. Hull and engine repairs can be made; marine railway, 50 tons; lift, 5 tons.

Main Creek is separated from Back Creek by **Spit Neck.** Both branches have depths of 7 to 9 feet almost to their heads and are much used by pleasure craft.

Several marinas are on **Graveyard Point,** on the south side of Main Creek 0.2 mile above the mouth. Gasoline, diesel fuel, slips, and some marine supplies can be obtained. Hull and engine repairs can be made. Largest haul-out capacities are: railway, 55 feet; lift, 5 tons.

A wreck is reported about 300 yards southeastward of Graveyard Point.

A marina at the entrance to **Perry Cove,** 1.3 miles above the mouth of Main Creek, has gasoline and some marine supplies. Hull and engine repairs can be made; lift, 30 tons.

Rock Point is on the southwest side of Patapsco River 3 miles above Bodkin Point. Back of Rock Point is an elevated water tank, and a pier extends out from the Rock Creek side to depths of 5 feet or more. **White Rocks,** 0.6 mile northwest of Rock Point, are about 15 feet high and marked by a light; the deepest water is north and west of the rocks.

A 130°–310° measured course, 1,000 yards long, is 1 mile eastward of Rock Point (39°10.0′N., 76°28.7′W.). The course is marked by private seasonal buoys.

Rock Creek, on the northwest side of Rock Point, has depths of 11 feet almost to the head. It is marked; a light on the east side marks the narrow part of the channel off **Fairview,** 0.5 mile above the mouth.

Wall Cove empties into the southeast side of Rock Creek along the south side of Fairview. The Maryland Yacht Club piers on the Fairview side of the entrance have depths of about 13 feet at their outer ends.

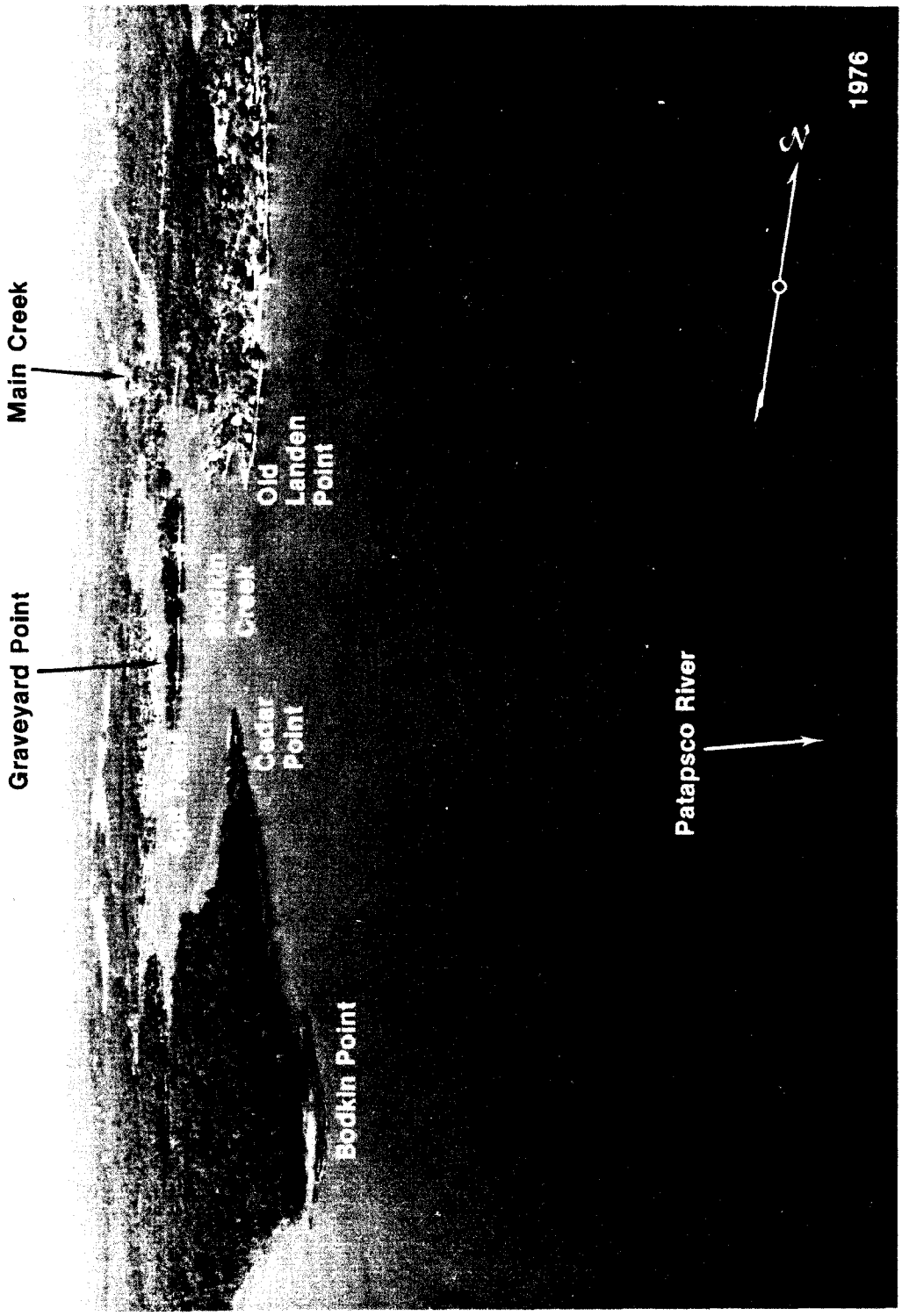
There are several marinas and boatyards in Wall Cove and along Rock Creek where marine supplies, gasoline, diesel fuel, and water can be obtained. Largest haul-out capacities for hull and engine repairs are: marine railway, 50 feet; lift, 50 tons.

Stony Creek, on the southwest side of Patapsco River 5 miles above Bodkin Point, has depths of 12 feet or more almost to the head. The channel along the west side of the entrance is about 70 yards wide and marked by a light and buoys; the east side is obstructed by rocks, some of which bare at all stages of the tide. The State Route 173 highway bridge 0.8 mile above the mouth of Stony Creek has a 40-foot bascule span with a clearance of 18 feet. The bridgetender monitors VHF-FM channel 16 and works on channels 13 and 68; call sign KAJ-667. (See **117.1 through 117.59 and 117.573,** chapter 2, for drawbridge regulations.) A marina on the north side just above the bridge has gasoline.

Nabbs Creek, a tributary on the northwest side of Stony Creek, 1 mile above the mouth, has depths of 12 feet almost to the head. A marina near the head of the creek has gasoline, diesel fuel, berths, and marine supplies. Hull and engine repairs can be made. A marine railway can handle craft up to 60 feet; a 15-ton lift is available.

Back Cove, on the north side of Nabbs Creek near the

BODKIN CREEK, MARYLAND



mouth, has depths of 12 feet to a boatyard 0.3 mile above the entrance. The marine railway can handle craft up to 60 feet for hull and engine repairs; gasoline is available.

Old Road Bay, which empties into the north side of Patapsco River along the west side of North Point, has general depths of 7 to 12 feet. A rock covered 1 foot, 1.1 miles northwest of North Point, is marked by a buoy; a light marks the edge of a shoal that extends westward from North Point; a light 0.25 mile off the north shore of the bay marks a shoal that extends 0.5 mile from the west shore. In 1970, an underwater obstruction was reported about 150 yards south of the light; mariners are advised to exercise caution in this area.

North Point Creek and **Jones Creek,** which empty into the northeast and northwest corners of Old Road Bay, respectively, have depths of 4 to 6 feet. Approach both creeks by passing eastward of the light off the north shore of the bay, being careful to avoid the reported underwater obstruction about 150 yards south of the light. Small-craft facilities are in both creeks.

Charts 12281, 12278.–Baltimore, one of the major ports of the United States, is at the head of tidewater navigation on Patapsco River. The midharbor point, at the intersection of Fort McHenry and Ferry Bar Channels 0.6 mile southeast of Fort McHenry, is 8 miles from the mouth of the river, 150 miles above the Virginia Capes, and 62 miles from Delaware River.

Principal imports are general cargo, crude petroleum and petroleum products, iron ore, chrome and manganese, gypsum, lumber, motor vehicles, fertilizers, sugar, and bananas; exports are chiefly general cargo, grains, metal products, coal, and chemicals. Coastwise receipts are crude petroleum and petroleum products, fertilizers, sulfur, sugar, and lumber; shipments are mostly petroleum and metal products.

Channels.–Federal project channels were discussed at the beginning of the chapter. The branch channels will be covered in the descriptions of the tributaries.

Anchorages.–General, dead ship, and small-craft anchorages are in Baltimore Harbor. (See **110.1 and 110.158,** chapter 2, for limits and regulations.)

Tides and currents.–The mean range of tide is 1.1 feet at Baltimore; daily predictions are given in the Tide Tables. Prolonged winds of constant direction may cause substantial variation in the tide. Currents in the harbor are 0.8 knot on the flood and ebb. (See the Tidal Current Tables for daily predictions.) In May 1981, strong currents were reported in the vicinity of Fort Carroll and Brewerton Angle on the change of tides.

Weather.–Baltimore is in a region about midway between the rigorous climates of the North and the mild climates of the South and adjacent to the modifying influences of the Chesapeake Bay and Atlantic Ocean to the east and the Appalachian Mountains to the west. The net effect is to produce a more equable climate compared to inland locations of the same latitude.

Rainfall distribution throughout the year is rather uniform; however, the greatest intensities are confined to the summer and early fall, the season for hurricanes and severe thunderstorms. Rainfall during this period occurs principally in the form of thundershowers, and rainfall totals during these months vary appreciably, depending on the number of thundershowers which occur largely by chance in a given locality. Hurricane force winds, however, may occur on rare occasions due to a severe cold front or a severe thunderstorm. The greatest damage by hurricanes is that produced along waterfronts and shores by the high tides and waves.

In summer, the area is under the influence of the large semipermanent high-pressure system commonly known as the Bermuda High and centered over the Atlantic Ocean near latitude 30°N. This high-pressure system brings a circulation of warm, humid airmasses over the area from the deep South. The proximity of large water areas and the inflow of southerly winds contribute to high relative humidities during much of the year.

January is the coldest month, and July, the warmest. Winter and spring have the highest average windspeeds. Snowfall occurs on about 25 days per year on the average; however, an average of only 9 days annually produce snowfalls greater than 1.0 inch. Although heaviest amounts of snow generally fall in February, occasional heavy falls occur as late as March. Records for the period, August 1950 through December 1967, indicate that the average date of the last temperature as low as 32° in the spring is April 15, while the average date of the first temperature as low as 32° in the autumn is October 26.

Glaze or freezing rain occurs on an average of two to three times per year, generally in January or February. However, some occurrences have been noted in November and December. Some years pass without the occurrence of freezing rain, while in others it occurs on as many as 8 to 10 days. Sleet is observed on about 5 days annually. The sleet season begins as early as November in some years, and ends as late as March in some cases, with the greatest frequency of occurrence in January.

The National Weather Service office is at Baltimore-Washington International Airport, about 7 miles southward of Baltimore. **Barometers** may be compared there or by telephone. (See page T–10 for **Baltimore climatological table.**)

Fogs occur chiefly from October to March, inclusive. From April to September there are only a few days with dense fogs. Very light winds clear the fog away.

Ice.–Baltimore Harbor is frozen over during severe winters, but the ice-breakers and the larger power-driven vessels keep the dredged channels open so that self-propelled vessels seldom have difficulty in entering the harbor. Ice conditions in the main channel are most severe in the vicinity of Sevenfoot Knoll Light, where ice moving from the northern end of Chesapeake Bay tends to collect in packs. Navigation from Baltimore to the upper end of the bay and the Chesapeake and Delaware Canal is likely to be interrupted by ice for short periods during an average winter.

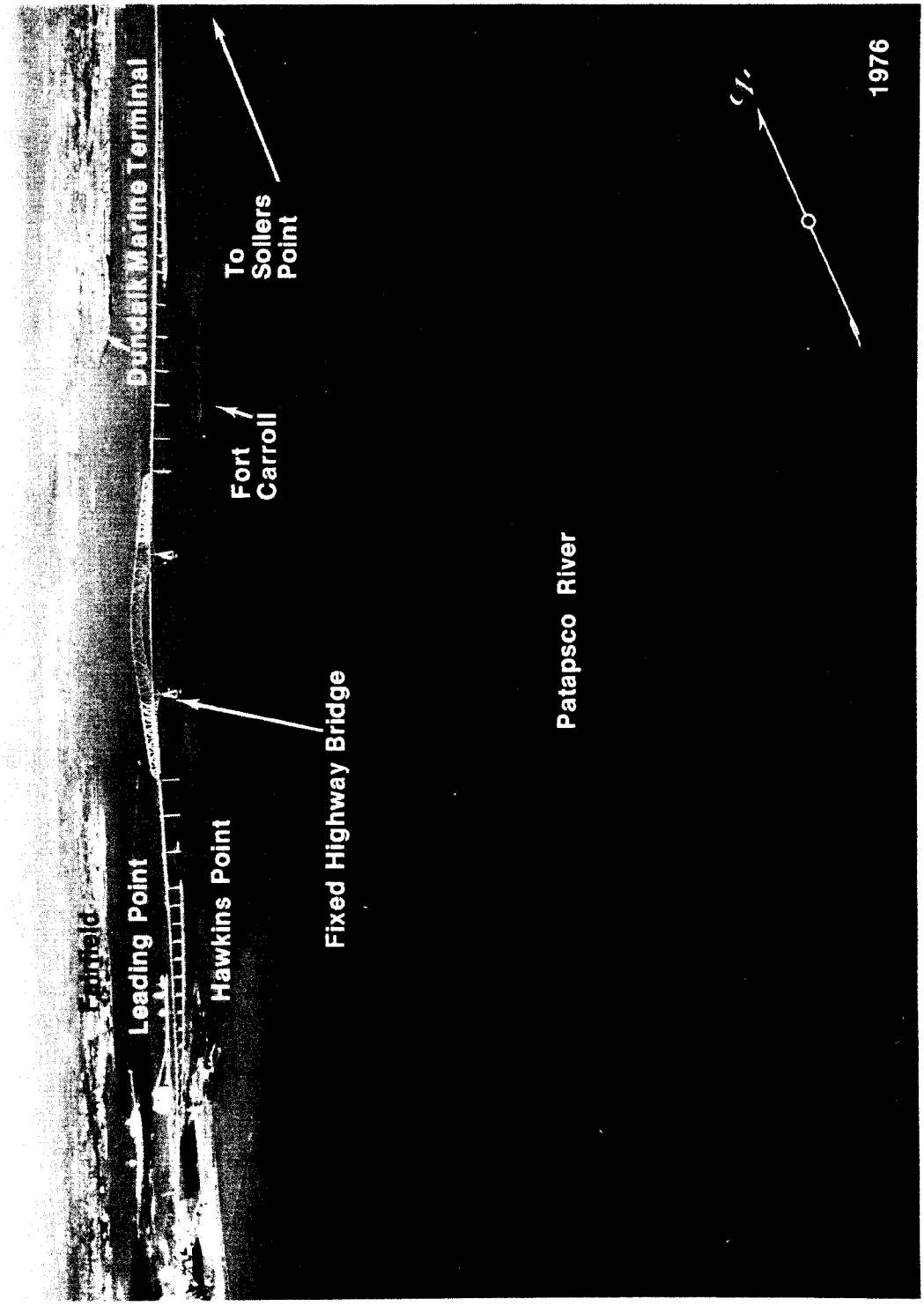
During the ice navigation season, the waters described in this chapter are a **regulated navigation area.** (See **165.503,** chapter 2, for limits and regulations.)

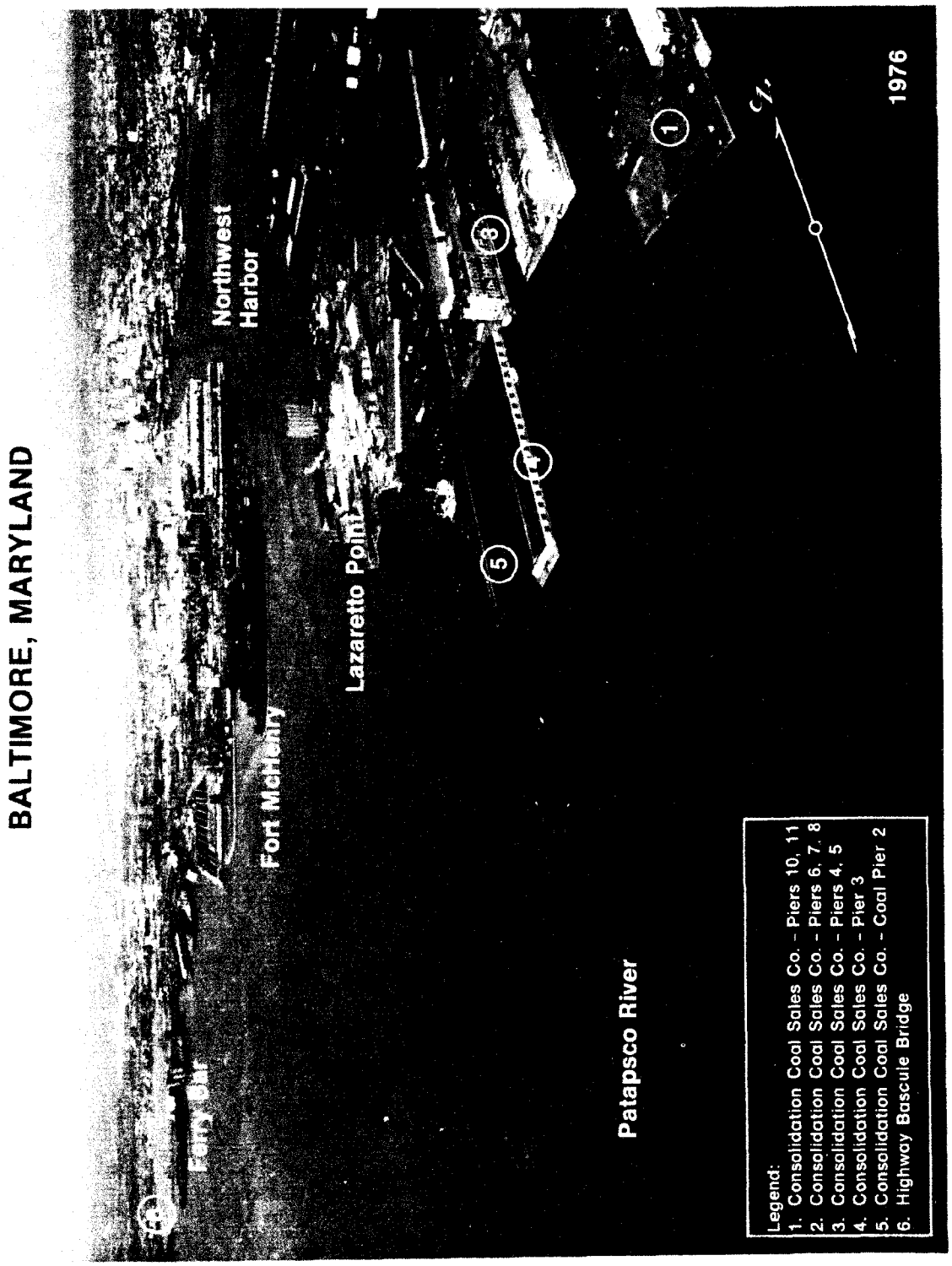
Pilotage is compulsory for all foreign vessels and for U.S. vessels under register in the foreign trade bound to or from the port of Baltimore. Pilotage is optional for U.S. vessels under enrollment in the coastwise trade who have on board a pilot licensed by the Federal Government for these waters.

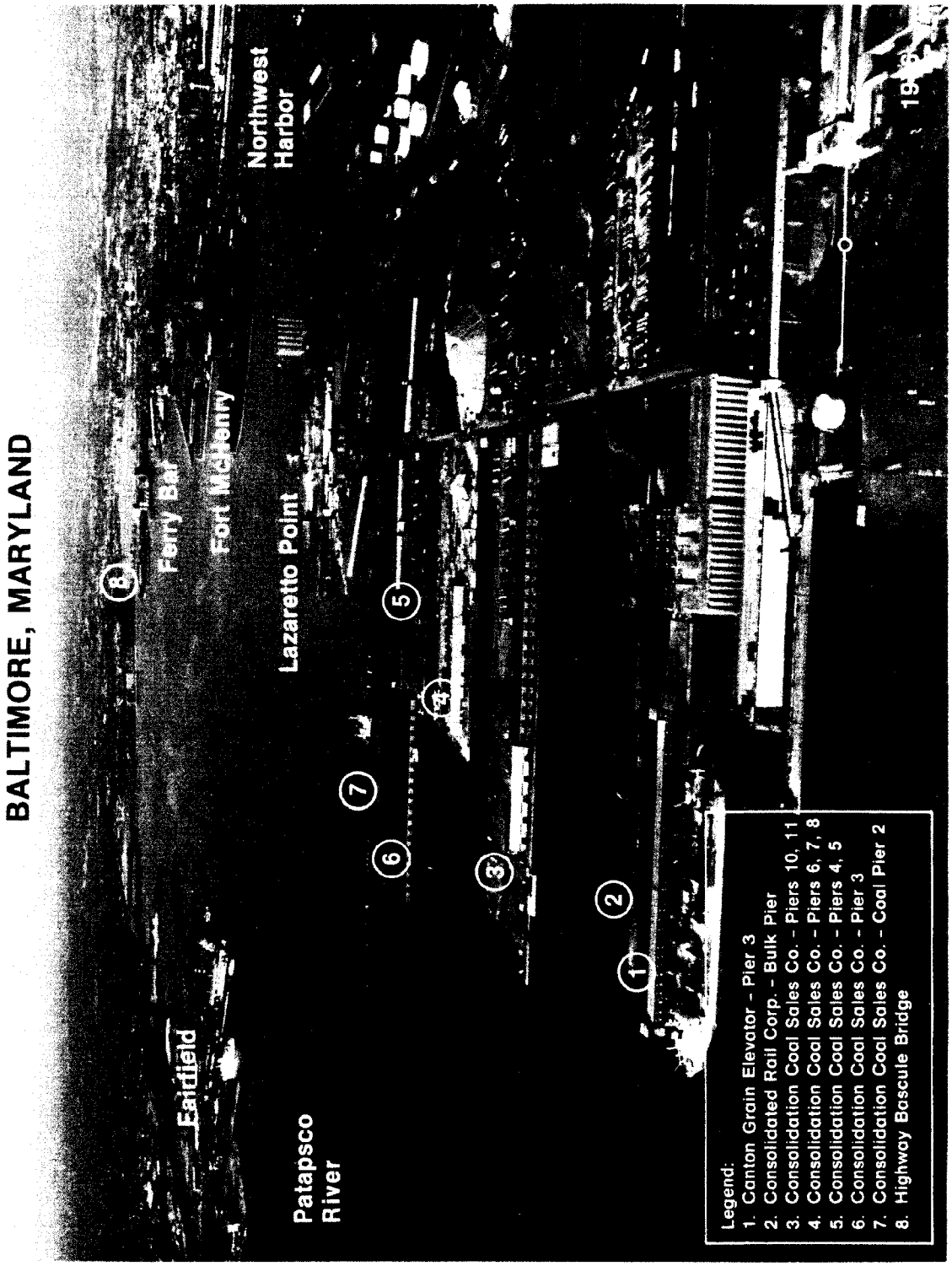
The Association of Maryland Pilots offers pilotage, for any vessel, between Baltimore and the Virginia Capes, and between Baltimore and the Maryland entrance to the Chesapeake and Delaware Canal at Chesapeake City, Md. Pilots of the association also serve Maryland ports in the tributaries of Chesapeake Bay and the District of Columbia.

The Chesapeake and Interstate Pilots Association offers pilot services to U.S. vessels, engaged in the coastwise trade, and public vessels to or from Baltimore, via the Chesapeake Bay if the vessel is entering from sea at Cape Henry or transiting between any port or place on the Chesapeake Bay and its tributaries. Pilot service is also offered to vessels to or from Baltimore that are transiting the Chesapeake and

BALTIMORE, MARYLAND




BALTIMORE, MARYLAND
Northwest Harbor
Lazaretto Point
Fort McHenry
Patapsco River
1976
Legend:
1. Consolidation Coal Sales Co. - Piers 10, 11
2. Consolidation Coal Sales Co. - Piers 6, 7, 8
3. Consolidation Coal Sales Co. - Piers 4, 5
4. Consolidation Coal Sales Co. - Pier 3
5. Consolidation Coal Sales Co. - Coal Pier 2
6. Highway Bascule Bridge


BALTIMORE, MARYLAND
Northwest Harbor
Ferry Bar
Fort McHenry
Lazaretto Point
Fairfield
Patapsco River
1
2
3
4
5
6
7
8
Legend:
1. Canton Grain Elevator - Pier 3
2. Consolidated Rail Corp. - Bulk Pier
3. Consolidation Coal Sales Co. - Piers 10, 11
4. Consolidation Coal Sales Co. - Piers 6, 7, 8
5. Consolidation Coal Sales Co. - Piers 4, 5
6. Consolidation Coal Sales Co. - Pier 3
7. Consolidation Coal Sales Co. - Coal Pier 2
8. Highway Bascule Bridge

Delaware Canal. Pilots will meet vessels upon prior arrangement at Cape Henlopen or any port or place on the Delaware Bay and River, at Cape Henry or any port or place on the Chesapeake Bay and its tributaries. Pilots will also meet vessels at various ports in the northeast and provide all pilot services required from the port of departure to the port of arrival. Arrangements for pilots may be made through the ships' agents or the pilot office in Norfolk (telephone, 804-855-2733; cable, CINPILOT).

The Association of East Coast Pilots offers pilotage to public vessels and U.S. vessels in the coastwise trade transiting between Baltimore, via the Chesapeake and Delaware Canal, and many ports northeast. (See Pilotage, chapter 3.)

Pilotage information for incoming vessels is given in chapters 6, 7, and 9.

Towage.–Tugs up to 3,800 hp are available at all times to assist vessels arriving or departing, in docking or undocking, and in shifting within the harbor. Long-distance towage is also available. Tug services are usually arranged for in advance through ships' agents.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Baltimore is a **customs port of entry.**

Coast Guard.–A **Marine Safety Office** is in Baltimore. (See appendix for address.)

Harbor regulations.–The Maryland Port Administration has general jurisdiction over the physical operation of Baltimore Harbor and issues rules and regulations pertaining to the use of the public wharves and piers. The Port Administration office is at the World Trade Center Baltimore, Baltimore, Md. 21202.

Wharves.–Baltimore has more than 200 piers and wharves at Locust Point, Port Covington, Fairfield, Curtis Bay, Hawkins Point, Sparrows Point, Dundalk, Lower Canton, Canton, Lazaretto Point, and in the Inner Harbor. Only the deep-draft facilities are described. For a complete description of the port facilities refer to Port Series No. 10, 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 of the latest depths contact the Maryland Port Administration or the private operator.) All of the facilities have direct highway connections, and most have railroad connections. Water and electrical shore-power connections are available at most piers and wharves.

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. A 350-ton crane is at Locust Point; a 275-ton floating crane can be rented. Numerous warehouses and cold storage facilities adjacent to the waterfront are available. Several municipal piers, administered by the city **harbormaster** whose office is on Municipal Pier 4, are used mainly by coastwise vessels.

Facilities at Locust Point:

Amstar Corp., Baltimore Refinery Raw Sugar Dock (39°16′32″N., 76°35′42″W.): 1,040 feet of berthing space with dolphins; 27 to 32 feet alongside; deck height, 7 feet; 12-ton buckets and 40-inch conveyor belt, unloading rate, 300 tons per hour; receipt of bulk raw sugar; owned and operated by Amstar Corp.

Proctor and Gamble Manufacturing Co., Baltimore Plant Dock (39°16′34″N., 76°35′30″W.): 655 feet of berthing space with dolphins; 25 feet alongside; deck height, 6 feet; receipt of coconut oil, crude glycerine, and caustic soda; owned and operated by Proctor and Gamble Manufacturing Co.

Maryland Port Administration Locust Point Terminal, Piers 10 through 3:

Pier 10 (39°16′30″N., 76°35′20″W.): east side 610 feet long; 30 to 34 feet alongside; deck height, 6 feet; receipt of liquid latex, caustic soda, molasses, asphalt, and occasional shipment of molasses; owned by Baltimore and Ohio Railroad Co., and operated by Maryland Port Administration, Namolco, Inc., and Uniroyal, Inc.

Pier 7 (39°16′23″N., 76°35′09″W.): east side 1,000 feet long; west side 820 feet long; 43 to 32 feet alongside; deck height, 6 to 10 feet; 3.2-million-bushel capacity, loading rate, 75,000 bushels per hour through four conveyor booms, 26 loading spouts, 36 chutes; receipt and shipment of bulk grains; owned and operated by Indiana Grain, Division of Indiana Farm Bureau Cooperative Association, Inc.

Piers 4–5 (39°16′19″N., 76°35′00″W.): 375-foot face, east and west sides 1,200 feet long; 35 to 34 feet alongside; deck height, 9 feet; 130,000 square feet covered storage, 30 acres open storage, 2-million-gallon storage capacity; two traveling revolving gantry cranes to 87 tons, pipelines, 12-foot-wide roll-on/roll-off ramp; receipt and shipment of general, container, and bulk cargoes; receipt of liquid latex, steel, and lumber; shipment of steel, scrap, and heavy equipment; owned by Baltimore and Ohio Railroad Co.; operated by Ramsay Scarlett and Co., Inc., Guthrie Industries, Inc., and Firestone Tire and Rubber Co.

Pier 3: 125 yards eastward of Pier 4 (East); 270-foot face, 35 to 38 feet alongside, deck heights, 5 and 9 feet; west side 1,212 feet long, 34 to 38 feet alongside, deck height, 5 to 9 feet; east side 1,230 feet long, 18 to 33 feet alongside, deck height, 9 feet; 137,000 square feet covered storage; receipt and shipment of general and containerized cargo, receipt of bulk liquid latex; owned by Baltimore and Ohio Railroad Co.; operated by Chesapeake Operating Co., subsidiary of Lavino Shipping Co., and Firestone Tire and Rubber Co.

Maryland Port Administration, South Locust Point Marine Terminal, Berths 10–11 (39°15′44″N., 76°35′36″W.): 2,056-foot face; 36 feet alongside; deck height, 9 feet; two 40-ton traveling container cranes, 350-ton revolving stiff-legged derrick, 100-ton traveling gantry crane; 90,000 square feet covered storage; 37.5 acres open storage; receipt and shipment of containerized, roll-on/roll-off, and break-bulk cargo, and heavy machinery; owned by Maryland Port Administration; operated by I.T.O. Corp. of Baltimore.

Facilities at Port Covington:

Western Maryland Railway Co., Port Covington Terminal:

Piers 9 and 9A: 0.8 mile westward of Fort McHenry; 1,139-foot face; 31 feet alongside; deck height, 9 feet; cranes to 10-ton capacity; 270,000 square feet of covered storage; 8.5 acres open storage; receipt and shipment of general and containerized cargo, shipment of heavy equipment, receipt of bananas; owned by city of Baltimore; operated by Atlantic and Gulf Stevedores, Inc.

Piers 7–8: adjacent westward of Pier 9; 226-foot face, 35 feet alongside; northeast side 900 feet long, 35 feet alongside; southwest side 1,706 feet of berthing space, 36 to 35 feet alongside; deck height, 9 feet; cranes to 10-ton capacity; 210,000 square feet of covered storage, 7 acres open storage, receipt and shipment of general and containerized cargo, shipment of heavy equipment; owned by city of Baltimore and operated by Western Maryland Railway Co.

Pier 6: 150 yards westward of Piers 7–8; southwest side 1,524 feet long; 38 feet alongside; northeast side 1,434 feet long; 30 to 25 feet alongside; deck height, 6 feet; cranes to

15-ton capacity, unloading capacity 1,200 tons per hour; receipt and shipment of bulk cargoes; open storage for 30,000 tons of material; owned and operated by Western Maryland Railway Co.

Port Covington Grain Terminal Pier 2 (39°15′35″N., 76°36′20″W.): northeast side 1,490 feet of berthing space with dolphins; 45 feet alongside; deck height, 8 feet; conveyor belts, seven loading spouts 70,000 bushels per hour loading capacity, 5,000-bushel-per-hour unloader, 5-million-bushel grain elevators; owned and operated by Louis Dreyfus Co.

Facilities at Fairfield:

Weyerhaeuser Co. Baltimore Pier (39°14′58″N., 76°34′37″W.): west side, 825 feet of berthing space with dolphins; 34 feet alongside; east side, 575 feet of berthing space; 32 feet alongside; deck height, 6 feet; 20 acres open storage; receipt of automobiles; owned by Weyerhaeuser Co., and operated by Nissan Motor Co., Ltd.

ST Services Terminal (39°14′52″N., 76°34′30″W.): 628 feet of berthing space; 36 feet alongside; deck height, 46 feet; 16 storage tanks, capacity 395,216 barrels; receipt and shipment of chemicals, petroleum products, and fructose; owned and operated by ST Services.

Conoco Products Terminal Wharf (39°14′26″N., 76°33′55″W.): 582 feet with dolphins; 32 feet alongside; deck height, 6 feet; receipt and shipment petroleum products; owned by Conoco, Inc.; operated by Conoco, Inc., Sun Refining and Marketing Co., Ashland Oil, Inc., Chevron, U.S.A., Inc., Tenneco, Inc., Mobil Oil Corp.

Conoco Products Terminal Pier: immediately eastward of Conoco Products Terminal Wharf; northwest side 600 feet long; 34 feet alongside; deck height, 9 feet; receipt and shipment of petroleum products; owned by Conoco, Inc., operated by same operators as Conoco Products Terminal Wharf.

Shell Oil Co. Wagners Point Plant Pier (39°14′19″N., 76°33′40″W.): southeast side 840 feet with dolphins; 35 feet alongside; deck height, 8 feet; receipt and shipment of petroleum products, bunkering vessels; owned and operated by Shell Oil Co.

Facilities in Curtis Bay:

Amoco Oil Co., Baltimore Asphalt Terminal Dock No. 1 (39°13′27″N., 76°33′51″W.): 250-foot face with dolphins; 28 feet alongside; deck height, 6 feet; receipt and shipment of petroleum products, bunkering vessels; owned and operated by Amoco Oil Co.

BP and Texaco Oil Pier (39°13′30″N., 76°34′04″W.): west side 435 feet long with dolphins; 33 feet alongside; deck height, 8 feet; receipt and shipment petroleum products, bunkering vessels; owned and operated by BP Oil, Inc., and Texaco, Inc.

Chessie System, Curtis Bay Ore Pier (39°13′31″N., 76°34′49″W.): northeast side 800 feet of berthing space with dolphins; 42 feet alongside; deck height, 8 feet; cranes to 15-ton capacity, conveyor belt; unloading capacity 2,000 tons per hour; receipt and shipment of bulk ores; owned and operated by Baltimore and Ohio Railroad.

Chessie System, Curtis Bay Coal Pier (39°13′23″N., 76°34′38″W.): north side 900 feet long, 30 feet alongside; south side 900 feet long, 42 feet alongside; deck height, 8 feet; conveyor loading system, loading capacities 4,000 tons per hour north side, 6,000 tons per hour south side; shipment of coal; owned and operated by Baltimore and Ohio Railroad.

Curtis Bay Co., Bayside Coal Pier (39°13′18″N., 76°34′38″W.): north and south sides 909 feet long; 42 feet alongside; deck height, 9.5 feet; 6,000-ton-per-hour loading tower; shipment of coal; owned and operated by Curtis Bay Co., subsidiary of Occidental Petroleum Corp.

Olin Corp. Main Wharf (39°12′56″N., 76°35′00″W.): south side 800 feet with dolphins; 28 feet alongside; deck height, 7 feet; receipt of liquid sulfur, bauxite, and liquid sulphuric acid; owned and operated by Olin Corp., Olin Chemicals Group.

Amerada Hess Corp. Baltimore Terminal Pier (39°12′45″N., 76°34′50″W.): north side 700 feet long with dolphins; south side 500 feet long with dolphins; 37 feet alongside; deck height, 6 feet; receipt and shipment of petroleum products, bunkering vessels; owned by Amerada Hess Corp., operated by Amerada Hess Corp. and Crown Central Petroleum Corp.

Amoco Oil Co. Petroleum Corp. Dock (39°12′38″N., 76°34′56″W.): 250-foot face with dolphins; 32 feet alongside; deck height, 6 feet; receipt and shipment petroleum products; owned and operated by Amoco Oil Co.

W. R. Grace & Co., Davison Chemical Sulfuric Acid Pier (39°12′55″N., 76°34′23″W.): south side 425 feet of berthing space with dolphins; 28 feet alongside; deck height, 8 feet; receipt and shipment of sulfuric acid; owned and operated by W.R. Grace and Co., Davison Chemical Division.

U.S. Gypsum Co., Baltimore Plant Dock (39°13′08″N., 76°33′20″W.): south platform 740 feet with dolphins; 27 feet alongside; deck height, 11 feet; 42-inch conveyor belt; receipt of gypsum rock and aragonite sand by self-unloading vessel; owned and operated by U.S. Gypsum Co.

Facilities at Hawkins Point:

Maryland Port Administration Hawkins Point Pier (39°12′49″N., 76°32′23″W.): northwest and southwest sides 720 feet long; 36 feet alongside; deck height, 9 feet; 30-ton traveling gantry crane, unloading rate 550 tons per hour; 64,000-ton aluminum storage silo; 20,000-ton liquid fertilizer storage tanks; receipt of aluminum ore, liquid chemicals, and blister copper; owned by Maryland Port Administration and operated by Eastalco Aluminum Co. and Transmaryland Terminal Corp.

Facilities at Sparrows Point:

Bethlehem Steel High Pier (39°12′34″N., 76°29′05″W.): east and west sides 700 feet long; 25 to 38 feet alongside; deck height, 11 feet; receipt of fuel oil; owned and operated by Bethlehem Steel Corp.

Bethlehem Steel Ore Pier (39°12′06″N., 76°28′54″W.): 1,153 feet long with dolphins; 45 feet alongside; deck height, 15 feet; conveyor system, three unloading towers unload 4,500 tons per hour; receipt of bulk and pelletized ores; owned and operated by Bethlehem Steel Corp.

Bethlehem Steel Penwood Wharf (39°12′41″N., 76°27′41″W.) (chart 12278): 870 feet long; 32 feet alongside; deck height, 12 feet; mobile cranes from steel plant; 50,000 square feet of covered storage; shipment of finished steel products; owned and operated by Bethlehem Steel Corp.

Facilities at Dundalk:

Dundalk Marine Terminal (39°14′42″N., 76°32′20″W.): 34 feet alongside Berths 1 through 13; deck heights, 9 feet; cranes to 75-ton capacity; 441,000 square feet of covered storage, 500 acres open storage; receipt and shipment of general cargo, container cargo, roll-on/roll-off cargo, molasses, and passenger service; owned and operated by Maryland Port Administration and Pacific Molasses Co.

Berths 1–6; northwest face, 3,800 feet long.

Berths 7–10; southwest face, 2,822 feet long.

Berths 11–13; southeast face, 2,860 feet long.

Facilities at Lower Canton:

Western Electric Co., Baltimore Works Wharf (39°15′17″N., 76°32′17″W.): 1,358 feet of berthing space; 10 to 30 feet alongside; deck height, 7 feet; two 7½-ton

locomotive cranes; shipment of cable; owned and operated by Western Electric Co.

Sea-Land Service Sea-Girt Terminal Wharf (39°15′30″N., 76°33′12″W.): west side 700 feet long; 32 feet alongside; roll-on/roll-off wharf 300 feet long; 30 feet alongside; deck height, 9 feet; 27-ton traveling container crane; 34,000 square feet of covered storage; 22.6 acres of open storage; receipt and shipment of containerized and roll-on/roll-off cargo; owned by Canton Co. of Baltimore and operated by Sea Land Service, Inc.

Gold Bond Building Products Baltimore Plant Pier (39°15′32″N., 76°33′17″W.): east side 594 feet long; 32 feet alongside; deck height, 8 feet; conveyors unload 500 tons per hour; receipt of gypsum rock; owned by the city of Baltimore and operated by Gold Bond Building Products, Division of National Gypsum Co.

Canton Grain Elevator, Pier 3 (39°15′27″N., 76°33′22″W.): east side 690 feet long, 37 feet alongside; west side 1,418 feet long; 33 feet alongside; deck heights, 8 and 12 feet; 3.9-million-bushel grain elevator, 11 loading spouts, loading capacity 80,000 bushels per hour; receipt and shipment of bulk grains; owned and operated by C.S.Y. Finance, Inc., Canton Elevator Division.

Consolidation Coal Sales Co., Marine Terminal Pier 11 (39°15′25″N., 76°33′33″W.): east side 1,623 feet long; 32 feet alongside; deck height, 8 feet; 102,600 square feet of covered storage; 22 acres of open storage; receipt and shipment of general and containerized cargo; owned and operated by Consolidation Coal Sales Co.

Consolidation Coal Sales Co., Marine Terminal Pier 10 (39°15′25″N., 76°33′38″W.): west side 1,485 feet long; 30 to 32 feet alongside; deck height, 8 feet; receipt and shipment of containerized cargo; owned and operated by Consolidation Coal Sales Co.

Consolidation Coal Sales Co., Marine Terminal Piers 6, 7, 8 (39°15′30″N., 76°33′43″W.): east side 1,069 feet long; 32 feet alongside; west side 927 feet long; 30 to 20 feet alongside; deck height, 8 feet; 38,000 square feet covered storage; receipt and shipment of general cargo; owned and operated by Consolidation Coal Sales Co.

Consolidation Coal Sales Co., Marine Terminal Piers 4–5 (39°15′30″N., 76°33′47″W.): east side 837 feet long; 30 to 20 feet alongside; deck height, 6 feet; 100,600 square feet covered storage; receipt and shipment of general cargo; owned and operated by Consolidation Coal Sales Co.

Consolidation Coal Sales Co., Marine Terminal Pier 3: about 250 yards south of Piers 4–5; east side 818 feet long; west side 859 feet long; 35 feet alongside; deck height, 8 feet; cranes up to 75 tons; 87,000 square feet of covered storage; receipt and shipment of general cargo; owned and operated by Consolidation Coal Sales Co.

Consolidation Coal Sales Coal Pier 2: 125 yards west of Pier 3; east side 802 feet long, 27 feet alongside; west side 1,283 feet of berthing space with dolphins; 42 to 50 feet alongside, deck height, 6 feet; conveyor system loads 7,000 tons per hour; shipment of coal; owned and operated by Consolidation Coal Sales Co.

Facilities at Lazaretto Point:

Rukert Terminals Corp., Lazaretto Depot, Berth B (39°15′38″N., 76°34′18″W.): south side 575 feet long; 34 feet alongside, deck height, 9 feet; 21,000 square feet covered storage; receipt and shipment of general cargo, receipt of bulk cargoes; owned and operated by Rukert Terminals Corp.

Agrico Chemical Co. Pier (39°15′52″N., 76°34′19″W.): north side 540 feet with dolphins; 30 feet alongside; deck height, 8 feet; receipt of liquid and dry bulk fertilizers; owned and operated by Agrico Chemical Co.

Facilities at Canton:

ConRail Canton Coal Pier (39°15′54″N., 76°34′20″W.): north and south sides 910 feet long, 30 feet alongside; deck height, 4 feet; two coal-loading towers, combined loading rate 1,800 tons per hour; shipment of coal; owned by ConRail and operated by Baltimore Contracting Co.

Rukert Terminals Corp., Clinton Street Terminal, Pier 5 (39°16′00″N., 76°34′16″W.): north side 870 feet long; 36 feet alongside; deck height, 7 feet; rapid discharge bulk handling crane with a rate of 700 tons per hour; 700,000 square feet covered storage, 5 acres open storage; receipt and shipment of general cargo and dry bulk commodities; owned and operated by Rukert Terminals Corp.

Clinton Street Marine Terminal Pier 1 (39°16′06″N., 76°34′22″W.): 223-foot face; north and south sides 1,100 feet long, 32 feet alongside; deck height, 10 feet; cranes to 18 tons; 250,000 square feet covered storage; receipt and shipment of general, containerized, and roll-on/roll-off cargo, and heavy equipment; owned by Maryland Port Administration and operated by Atlantic and Gulf Stevedores, Inc.

Petroleum Fuel and Terminal Co. South Dock (39°16′19″N., 76°34′21″W.): north side 660 feet long with dolphins; south side 773 feet long with dolphins; 42 feet alongside; deck height, 8 feet; receipt of fuel oil; owned and operated by Petroleum Fuel and Terminal Co., subsidiary of Apex Oil Co.

Petroleum Fuel and Terminal Co. North Dock (39°16′23″N., 76°34′22″W.): 400 feet of berthing space with dolphins, 42 feet alongside; deck height, 5 feet; receipt and shipment of petroleum products; owned and operated by Petroleum Fuel and Terminal Co., subsidiary of Apex Oil Co.

Exxon Co., U.S.A., Baltimore Terminal, Pier 1 (39°16′30″N., 76°34′23″W.): north and south sides 830 feet long with dolphins; 37 to 39 feet alongside; deck height, 9 feet; receipt and shipment of petroleum products, bunkering vessels; owned and operated by Exxon Co., U.S.A.

Exxon Co., U.S.A., Baltimore Terminal, Pier 3: 100 yards north of Pier 1, north and south sides 405 feet long, 12 to 22 feet along north side, 27 to 30 feet along south side; deck height, 9 feet; receipt and shipment of petroleum products; owned and operated by Exxon Co., U.S.A.

Facilities on Northwest Harbor:

Belt's Piers 1 and 2 (39°16′48″N., 76°35′29″W.): face 118 feet of berthing space, 20 feet alongside; deck height, 5 feet; south side 213 feet of berthing space; 12 to 20 feet alongside; deck height, 4 feet; receipt and shipment of general cargo; owned and operated by Belt's Wharf Warehouses, Inc.

Supplies.–Marine supplies of all kinds are available in the Port of Baltimore. All grades of heavy marine bunker fuel, lubricants, and diesel oil can be obtained. Vessels may bunker directly at marine oil terminals or may be serviced by barge at anchor. Most of the piers and wharves described have water and shore power connections. Water can also be delivered by waterboat anywhere in the harbor.

Repairs.–Baltimore is well equipped to make major repairs to large vessels. The largest graving dock in the area is at Bethlehem Steel Sparrows Point yard; it is 1,200 feet long, 198 feet wide, and has a depth of 23 feet over the blocks. The largest floating drydock in the area is at Bethlehem Steel Sparrows Point yard; it has a lifting capacity of 44,000 tons, is 882 feet long and 135 feet wide, and has 25 feet of water over the blocks. A graving dock at Bethlehem Steel Corporation, in Northwest Harbor, has a clear length of 591 feet, and is 81 feet wide, and has a water depth of 23 feet over the blocks.

Marine railways can haul out vessels up to 125 feet and up to 300 tons.

Shafts of any size required can be produced in the port. Several smaller repair facilities along the tributaries cater to yachtsmen and small-boat operators.

Baltimore has extensive facilities for wrecking and salvage. In addition to equipment especially designed for salvage operations, there are heavy hoisting facilities which, though primarily designed for private industrial purposes, are available in case of need.

Communications.–Nearly all the piers and wharves in Baltimore Harbor are near the center of the city, and all are connected to it by wide paved streets. Most of the piers and wharves have direct connections with mainline railroads whose tracks are connected with all parts of the port area.

The Port of Baltimore is served by the Consolidated Rail Corporation (ConRail), the Chesapeake and Ohio Railway (Chessie System), the Baltimore and Ohio Railroad (Chessie System), and the Western Maryland Railway. The Canton Railroad is a terminal line that operates about 35 miles of track in the port area and connects with the major railroads.

More than 100 steamship companies connect Baltimore with principal U.S. and foreign ports by regular sailings in the overseas, coastwise, and intercoastal trades. About 150 motor truck carriers service the port.

Several major airlines provide frequent scheduled services between **Baltimore-Washington International Airport,** inland about 7 miles southwestward of Fort McHenry, and domestic and overseas points.

The Maryland Port Administration radiotelegraph station **WMH** provides ship-to-shore communications on a 24-hour basis on 428, 500, 6519.5, 8686, and 12952.5 kHz. This station reports local harbor information to shipping.

The **Baltimore Maritime Exchange,** on the Baltimore Recreation Pier, provides, to its members, information concerning ship movements, local harbor conditions, weather data, and various other services; the exchange operates on VHF-FM channel 11 from 0400 to 1900, call sign KXR-71. Members are requested to contact the Association of Maryland Pilots on VHF-FM channels 11, 13 or 16 at other than the previously mentioned times; call sign WOT.

Sparrows Point, on the northeast side of Patapsco River 3 miles above the mouth, is the site of the Bethlehem Steel Corp. steel and shipbuilding plants. The two marked channels on the south side of Sparrows Point lead from the main channel in Baltimore Harbor to the ore-handling wharves; the easterly channel (chart 12278) had a reported controlling depth of 28 feet in 1979. The westerly channel, in 1975, had a controlling depth of 40 feet. In August 1977, shoaling to 18 feet was reported on the west side of the channel between Buoys 7 and 9.

The marked channel on the west side of Sparrows Point has a controlling depth of about 22 feet and leads to the shipyard facilities; a marked branch coal pier channel in June-August 1977, had a controlling depth of 21 feet.

Bear Creek, on the northeast side of Patapsco River 4 miles above the mouth, has channel depths of 8 feet or more almost to the head, 3.5 miles above the mouth. Rocks, covered 2 feet and marked by a daybeacon, are about 550 yards southeast of Sollers Point in about 39°13′10″N., 76°31′01″W. Numerous piles and obstructions are in the entrance to the creek between Coffin Point and Lloyd Point. An overhead power cable 1 mile above the mouth has a clearance of 95 feet between the lighted structures, and 62 feet elsewhere. A fixed highway bridge with a clearance of 53 feet crosses Bear Creek from the northern side of **Coffin Point** to the opposite shore.

Peachorchard Cove, on the west side of Bear Creek about 0.8 mile above the entrance, has depths of 7 feet for 0.4 mile to within 0.1 mile of its head.

A highway bridge 0.5 mile up Bear Creek has a bascule span with a clearance of 25 feet. (See **117.1 through 117.59 and 117.543,** chapter 2, for drawbridge regulations.) The railroad bridge 0.9 mile above the fixed bridge has a swing span with a clearance of 8 feet. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.)

Lynch Cove, on the northwest side of Bear Creek 1 mile above the fixed bridge, has general midchannel depths of 8 feet or more for about 0.6 mile, thence shoaling to 1 foot to the head 0.8 mile above the entrance.

There are several small-craft facilities in Lynch Cove.

Schoolhouse Cove, 1.6 miles above the fixed bridge, has depths of 7 feet to near the head. A small boatyard in the cove can haul out boats up to 45 feet for hull and engine repairs. A yacht club is on the east side of Bear Creek just below Schoolhouse Cove.

The highway bridge over Bear Creek just above Schoolhouse Cove, has a bascule span with a clearance of 12 feet. (See **117.1 through 117.59 and 117.543,** chapter 2, for drawbridge regulations.)

A 6 m.p.h. **speed limit** is enforced in Bear Creek above Lynch Cove on Saturdays, Sundays, and holidays.

Fort Carroll is a stone-and-concrete structure on the northeast side of Patapsco River main channel 4.4 miles above the mouth. The white tower of the abandoned lighthouse is on the west front of the fort.

Hawkins Point, on the southwest side of Patapsco River 4.5 miles above the mouth, is at the southeastern limits of Baltimore. There are many obstructions surrounding the point. A privately dredged and marked 33-foot channel leads to a 720-foot-long cargo pier with rail and truck connections 0.4 mile northwestward of the point.

The **Francis Scott Key Bridge,** a fixed highway bridge with a clearance of 185 feet, crosses the Patapsco River between Hawkins Point and Sollers Point.

Curtis Bay, on the southwest side of Patapsco River 6 miles above the mouth, is the approach to large coal and oil wharves and to several plants. The entrance is between Leading Point and Fishing Point, 0.8 mile to the northwestward. Depths in well-marked Curtis Bay Channel were given at the beginning of this chapter.

A privately dredged channel leads to the gypsum pier with mooring dolphins and conveyor belt 0.2 mile west of Leading Point. In 1983, a controlling depth of 24 feet was in the channel.

The petroleum terminals on **Fishing Point,** the ore pier on the southwest side of **Stonehouse Cove,** the coal pier at the head of Curtis Bay, and the other deep-draft facilities in Curtis Bay were described earlier in this chapter under Wharves, Baltimore Harbor.

Curtis Creek empties into the head of Curtis Bay from southward between **Sledds Point** and **Ferry Point,** 0.3 mile to the southwestward. The creek is buoyed at critical points. In 1975–1976, 21 feet could be carried at midchannel to Arundel Cove.

Cabin Branch, on the west side of Curtis Creek just south of Ferry Point, has depths of 17 feet or more to within 0.1 mile of a fixed bridge 0.4 mile above the entrance. The industrial wharves on the north side of the branch have reported depths of 12 to 28 feet at their faces.

Several of the wharves on either side of Curtis Creek between the entrance and Pennington Avenue bridge have depths of 25 to 30 feet at their faces.

A shipyard on the west side of Curtis Creek just north of the new Pennington Avenue bridge has a marine railway

that can handle vessels up to 125 feet for hull and engine repairs; cranes to 65 tons are available.

Above its entrance, Curtis Creek is crossed by the following bascule highway bridges: at Mile 0.85, the Pennington Avenue bridge, clearance 40 feet; at Mile 0.86, the Route 695 bridge, clearance 60 feet. In 1980, a new Route 695 bridge span with a design clearance of 58 feet was under construction just southward of the aforementioned Route 695 bridge. At Mile 1.3, a railroad bridge has a swing span with a clearance of 13 feet. (See **117.1 through 117.59 and 117.557**, chapter 2, for drawbridge regulations.)

Arundel Cove is on the east side of Curtis Creek 1.6 miles above the entrance. The Coast Guard yard is on the north side of the cove. A highway bridge 0.4 mile above the entrance to the cove has a 28-foot fixed span with a clearance of 6 feet.

A depth of 13 feet can be carried up Curtis Creek from Arundel Cove to the forks 2.3 miles above the entrance. **Furnace Creek,** the west fork, in August 1976, had reported depths of 11 feet or more for 0.8 mile, then shoals gradually to 4 feet at the fixed highway bridge 0.4 mile farther up; the bridge has a clearance of 8 feet. Overhead power cables about 0.1 mile above the bridge have a least clearance of 56 feet. **Marley Creek,** the middle fork, has depths of 12 feet or more for 1.2 miles, then shoals gradually to 3 feet at a fixed bridge 1 mile farther up; the bridge has a clearance of 9 feet. Overhead power cables crossing Marley Creek have a least clearance of 32 feet.

A marine service pier on the west side of Marley Creek 1.3 miles above the forks has depths of 12 feet at the face. Gasoline and water are available. A marine railway can handle boats up to 50 feet for hull and engine repairs.

The **Fairfield** section of Baltimore begins 6.5 miles above the mouth of Patapsco River and extends upriver along the southwest side for more than 1 mile. Most of the piers and wharves handle paper, petroleum products, sulfur, chemicals, fertilizers, scrap metal, and lumber; depths range from 18 to 30 feet at most of the facilities, but depths of 25 to 34 feet are at the petroleum terminals at the southerly end of the section. The deep-draft facilities at Fairfield were described earlier in this chapter under Wharves, Baltimore Harbor.

Dundalk Marine Terminal, on the east side of Patapsco River 6.5 miles above the mouth, has two marked entrance channels. **Dundalk East Channel,** marked by buoys and a private **042°** lighted range, had a reported controlling depth of 25 feet in August 1978. **Dundalk West Channel,** marked by buoys and a private **030°** lighted range, had a reported controlling depth of 33 feet in 1976. Several cranes have been lost overboard and some ships have parted their lines while berthed at Dundalk Marine Terminal during extreme wind conditions. Mariners should contact Maryland Port Administration for details about safety requirements. The facilities at the terminal were described earlier in this chapter under Wharves, Baltimore Harbor.

Colgate Creek, just north of the Dundalk facility, has a controlling depth of 2 feet. A depth of about 24 feet can be carried to the Western Electric Co. Wharf by using Dundalk West Channel.

The fixed highway bridge 0.3 mile above the entrance has a clearance of 8 feet. The railroad bridge 0.8 mile above the entrance has a swing span with a width of 30 feet and a clearance of 5 feet; the swing span is inoperative and remains in a closed position. Overhead power cables crossing the creek have a least clearance of 28 feet.

The **Lower Canton** section of Baltimore begins on the north side of Patapsco River 7.5 miles above the mouth and extends westward to **Lazaretto Point.** Dredged and buoyed channels lead to the principal piers which handle general cargo, grain, ore, and chemicals; depths of 20 to 41 feet are at the berths. The deep-draft facilities in this section were described earlier in this chapter under Wharves, Baltimore Harbor.

Patapsco River turns sharply westward at the intersection of Ferry Bar Channel and main Fort McHenry Channel 7.8 miles above the mouth. About 0.7 mile wide between **Fort McHenry** on the north and Fairfield on the south, the river narrows to a width of 150 yards 10 miles above the mouth and meanders off to the southwestward while the deeper channel continues westward into **Middle Branch.**

Ferry Bar is a point on the north side of Ferry Bar Channel 1.5 miles westward of Fort McHenry.

(See Notice to Mariners and latest editions of the charts for the controlling depths in the well-marked Ferry Bar Channel and Spring Garden Channel to the Hanover Street highway bascule bridge over Middle Branch.) The controlling depths in the marked channel continuing westward into Middle Branch from the Hanover Bridge are about 5 feet to the railroad bridge in Middle Branch, thence 1 foot above the bridge.

The Western Maryland Railway **Port Covington** section of Baltimore begins 0.8 mile west of Fort McHenry and extends west and southwestward to Ferry Bar. The buoyed approach is 1.2 miles westward along Ferry Bar Channel. Depths of 30 to 40 feet are in the approach channels and 33 to 40 feet alongside the principal piers.

The deep-draft facilities in this section were described earlier in this chapter under Wharves, Baltimore Harbor.

Depths of about 5 to 8 feet are at the outer ends of piers at the boatyards northwestward of Ferry Bar. Hull and engine repairs can be made. The largest marine railway can handle boats up to 60 feet; largest mobile lift, 20 tons. Gasoline, diesel fuel, slips, and some marine supplies are available.

The Hanover Street bridge over Middle Branch 0.3 mile above Ferry Bar has a bascule span with a clearance of 38 feet at the center, and 23 feet for a central width of 150 feet. The Western Maryland Railway bridge, 1 mile above Ferry Bar, has a swing span with a clearance of 9 feet. (See **117.1 through 117.59 and 117.541**, chapter 2, for drawbridge regulations.)

Most of the marine facilities in Middle Branch are used by small vessels and barges for delivery of petroleum and coal for local consumption.

Northwest Harbor, the northerly branch of Patapsco River, is entered between Fort McHenry and Lazaretto Point, 8.2 miles above the mouth of Patapsco River. East Channel, a dredged channel with a project depth of 39 feet, extends north from the entrance for about 0.7 mile to a turning basin. West Channel, with a project depth of 35 feet, branches northwest from East Channel for about 0.8 mile to a turning basin. (See Notice to Mariners and latest editions of the charts for controlling depths.) Above the West Channel turning basin, depths of about 25 to 21 feet can be carried to the head of Northwest Harbor at Inner Harbor. In 1973, a submerged obstruction, a seven pile dolphin covered 9 feet, was reported in Northwest Harbor in about 39°16′04″N., 76°34′47″W.

Fort McHenry Tunnel, a vehicular tunnel, crosses under the entrance to Northwest Harbor, extending from Lazaretto Point to a point about 0.2 mile westward of Fort McHenry.

The Baltimore and Ohio Railroad **Locust Point** section is on the southwest side between Fort McHenry and Locust Point. Most of the piers handle general cargo, but some also handle bulk; depths alongside are 30 to 35 feet. The grain

elevator at pier 7 has a capacity of nearly 4 million bushels and can load 150,000 bushels per hour.

The piers and wharves on the east and north sides of Northwest Harbor handle general cargo, coal, petroleum products, chemicals, and fertilizers; depths alongside the principal facilities are 30 to 35 feet, and at the others, 15 to 25 feet. The deep-draft facilities in this section were described earlier in this chapter under Wharves, Baltimore Harbor.

The ship repair facilities in Northwest Harbor can handle large ocean-going vessels. The graving dock on the southwest side of the harbor 0.4 mile above Fort McHenry is 460 feet long, 58 feet wide at the bottom, with a water depth of 18 feet. The largest of the floating drydocks, 0.7 mile westward of Locust Point, is 882 feet long and 135 feet wide, has a water depth of 25 feet, and can lift 44,000 tons. The graving dock at this plant is 589 feet long and 81 feet wide at the bottom, and has a water depth of 23 feet. A shipbuilding basin, 1,200 feet long and 198 feet wide, is on the west side of Sparrows Point.

Inner Harbor, at the head of Northwest Harbor, has a marina on the south side with depths of 12 feet or more at the slips. Berths, electricity, gasoline, diesel fuel and some marine supplies are available.

A 6-knot **speed limit** is enforced in Inner Harbor.

Chart 12278.–Swan Point (39°08′41″N., 76°16′44″W.), on the east side of Chesapeake Bay opposite Patapsco River entrance, has been mentioned in chapter 14.

Tolchester Beach, on the east side of Chesapeake Bay 4.5 miles north-northeast of Swan Point, has a privately dredged entrance channel and basin. In September 1980, the reported controlling depth was 6 feet in the channel; depths of 4 to 6 feet were reported in the basin. Gasoline, diesel fuel, marine supplies, and limited berths are available. A 50-ton mobile lift is available for repairs.

In July 1980, an underwater obstruction was reported about 352°, 500 yards from Tolchester Light.

Fairlee Creek, on the east side of Chesapeake Bay 8.5 miles north-northeastward of Swan Point, has a narrow entrance between a jetty on the east and a long, low hook on the west. The privately buoyed entrance has depths of about 6 feet. In 1978, a submerged obstruction was reported in the entrance channel in about 39°16′11″N., 76°12′33″W. In September 1981, a submerged obstruction was reported inside the creek in about 39°15′42″N., 76°12′20″W. A marina with berthing facilities is on the east side of the creek just inside the entrance; gasoline, diesel fuel, and some marine supplies are available. Repairs can be made at the marina.

Worton Point (39°19′10″N., 76°11′14″W.) is on the east side of Chesapeake Bay 152.5 miles above the Virginia Capes. A flashing white light is shown from a watch tower on the point during the ice season; a flashing red light is shown from this structure at night when firing is in progress. (See **334.140,** chapter 2, for limits and regulations of the **restricted area.**)

About 1.5 miles southward of Worton Point is **Worton Creek,** which has depths of 10 to 12 feet in the broad bight at the entrance and 7 feet inside for 1.4 miles. Good anchorage, protected from easterly winds, is available in depths of 11 to 12 feet just inside the entrance. A good, well-protected anchorage in depths of 6 to 9 feet is also reported in the creek below Buck Neck Landing. The critical part of the channel, 0.5 mile above the entrance, is marked by buoys.

A marina at **Green Point Wharf,** on the east side of Worton Creek about 1.1 miles above the mouth, has gasoline, berths, and some marine supplies. The marina at **Buck Neck Landing** , on the east side of the creek 1.4 miles above the entrance, has gasoline, diesel fuel, and berthing facilities; marine supplies are available. Haul-out capacities for repairs are: railway, 60 feet; lift, 15 tons. The public bulkhead adjoining the fuel pier has depths of about 6 feet alongside.

Pooles Island, 10 miles northeastward of Baltimore Harbor entrance, is a portion of the Aberdeen Proving Ground complex constituting prohibited land areas and dangerous contiguous water areas. Landing is prohibited to all personnel and boats, primarily because of the presence of hazardous unexploded ordnance and because such landings violate Federal Regulations. (See **334.140,** chapter 2, for limits and regulations of the **restricted area.**)

Pooles Island has an abandoned lighthouse on the west side near the north end. On the island are the white skeleton towers of two lighted ranges, the rear tower common to both. The north range marks a reach of the main channel leading to the Chesapeake and Delaware Canal. The south range marks a passage across the middle ground east of the island. It is stressed that Pooles Island is a prohibited land area entirely within the Aberdeen Proving Ground complex and is covered with hazardous unexploded ordnance.

In 1969, shoaling was reported 1.2 miles east of the southern end of Pooles Island in about 39°16′26″N., 76°14′48″W.

Local magnetic disturbance.–Differences of as much as 5° from the normal variation have been observed in the channel from Pooles Island to Howell Point (chart 12274).

Pooles Island Bar Light (39°15.7′ N., 76°16.7′ W.), 27 feet above the water, is shown from a black skeleton tower on a cylinder base, in depths of 15 feet 0.8 mile south-southwestward of the island; the light is 147.1 miles above the Virginia Capes.

A buoyed lane extends southwestward between fishtrap areas from eastward of Pooles Island to the Baltimore channel 1 mile southward of North Point. The lane, with a minimum depth of 10 feet, is entered on the Pooles Island south range, bearing **264°**; Pooles Island Bar Light is on the northwest side of the lane.

The approach to the rivers between North Point (39°11′42″N., 76°26′38″W.) and Pooles Island is through a buoyed side lane southwestward of Pooles Island Bar Light.

Hawk Cove, 5 miles north-northeastward of North Point, has depths of 8 to 11 feet and is a good anchorage.

A shallow passage, 3 miles northeast of North Point, leads to Hawk Cove. The channel, marked by lights and daybeacons, had a reported controlling depth of 2½ feet in 1983.

Back River, which flows into the southwest end of Hawk Cove, has depths of 7 to 4 feet for 6 miles to a fixed highway bridge with a width of 46 feet and a clearance of 14 feet; overhead power cables above and below the bridge have a clearance of 34 feet. In July 1986, a replacement fixed highway bridge with a design clearance of 15 feet was under construction immediately below the existing fixed highway bridge. Even the smallest boats seldom go above the bridge. The channel, marked by private buoys and daybeacons, is clear except for a 4-foot middle ground about halfway between Hawk Cove and the bridge. A visible wreck is on the east side of Back River off Muddy Gut in about 39°16.9′N., 76°26.5′W.

There are small-craft facilities on both sides of Back River. (See the small-craft facilities tabulation on chart 12279 for services and supplies available.)

Charts 12278, 12274, 12273.–Middle River, 6.5 miles

north-northeastward of North Point, is entered through a marked dredged channel which leads to an anchorage basin at the Martin Marietta Company plant at the head of **Dark Head Creek,** the east fork of the river 3.2 miles above the mouth. In August 1972, the controlling depth to the anchorage basin was 8½ feet. The west fork of Middle River has depths of 7 feet to within 0.5 mile of a fixed bridge near the head.

A 6 m.p.h. **speed limit** is enforced on Saturdays, Sundays and holidays.

Sue Creek, on the south side of the entrance to Middle River, has depths of about 7 feet to the yacht club just inside the entrance, thence depths of 5 to 3 feet for 1 mile inside. The entrance is marked by a light.

Galloway Creek, a broad cove on the north side of Middle River just inside the entrance, has depths of 8 to 5 feet except along the shoreline.

Frog Mortar Creek, on the northeast side of Middle River 1.5 miles above the mouth, has depths of 6 to 8 feet. A 12-foot marked channel leads from Middle River to the Martin Marietta seaplane basin on the west side of the creek 0.5 mile above the entrance. A 6 m.p.h. **speed limit** is enforced on Saturdays, Sundays and holidays.

Hopkins Creek, on the southwest side of Middle River 2.6 miles above the mouth, has depths of 8 to 5 feet.

Numerous small-craft facilities are at the upper end of Middle River and in most of the tributaries.

Seneca Creek, 8 miles north-northeastward of North Point, has depths of 8 feet in the entrance and 5 to 6 feet into the several arms. A light marks the outer end of the shoal on the east side of the entrance. Gasoline, slips, and some marine supplies can be obtained at several marinas along the creek. Lifts to 25 tons are available for hull and engine repairs.

Gunpowder River, 9 miles northeastward of North Point, is entered through a channel marked by a light and buoys westward of **Spry Island Shoal,** in midentrance; the shoal is reported covered 2 to 4 feet and should be avoided. The river has channel depths of 11 feet for 2 miles, thence 6 to 8 feet for 3.5 miles, and thence about 5 feet in a privately dredged section which leads to the mouth of an unnamed creek below **Joppatowne.**

The fixed railroad bridge 6.3 miles above the mouth has a 19-foot channel span with a clearance of 11 feet. An overhead power cable at the bridge has a clearance of 37 feet.

Marinas above the bridge have slips, gasoline, and some marine supplies. A 15-ton mobile hoist is available for hauling out boats for hull and engine repairs.

Spry Island Shoal and most of Gunpowder River are within the **Aberdeen Proving Ground** complex, a **restricted area,** shown on charts 12273, 12274, and 12260. (See **334.140,** chapter 2, for limits and regulations.) The area is marked by private seasonal buoys. When night firings are conducted in the Spry Island Shoal and Gunpowder River areas within the Aberdeen Proving Ground complex, flashing red lights are shown on **Robins Point,** at the south end of Gunpowder Neck, and **Maxwell Point,** on the east side of Gunpowder River, 3.5 miles above the mouth.

Some waters of the Aberdeen Proving Ground are closed to the public at all times. Others have a limited access during specified hours. (See **334.140,** chapter 2, for limits and regulations.)

It is stressed that opening these restricted and dangerous waters to navigation in the Aberdeen Proving Ground complex does not include the privilege of landing personnel or boats on any of the Government property. All these land areas constitute an extremely hazardous risk due to the presence of unexploded ordnance. Any landings constitute punishable Federal offenses.

Additional information on this subject is contained in the pamphlet "Boater's Guide to Restricted Water Zone," published by the Aberdeen Proving Ground. This pamphlet is available at most local marinas in the area.

Chart 12274.–Bush River is on the northwest side of Chesapeake Bay 152 miles above the Virginia Capes. The lower 5 miles of the river are within the Aberdeen Proving Ground complex constituting prohibited land areas and restricted and dangerous water areas. A flashing red light is shown on **Pond Point,** on the east side 3.5 miles above the mouth, at night when firing is in progress. (See **334.140,** chapter 2, for limits and regulations of the **restricted area.**)

The river has minimum depths of 7 feet to the railroad bridge 6.3 miles above the mouth, thence 5 to 6 feet for another 1.5 miles. The approach to the river and the channel inside are marked by buoys and a light as far as **Tapler Point,** on the west side 3.5 miles above the mouth, and by a light, on the east side 0.3 mile southward of the railroad bascule bridge, which shows a high-intensity beam down river; the lower light, off the western shore about 2.7 miles above the mouth, shows high-intensity beams up and down river. The mean range of tide is 1.4 feet.

The railroad bridge 6.3 miles above the mouth of Bush River has a 35-foot bascule span with a clearance of 12 feet. (See **117.1 through 117.59 and 117.547,** chapter 2, for drawbridge regulations.) The power cable at the bridge has a clearance of 35 feet. A high-voltage power cable about 200 yards below the bridge has a clearance of 43 feet and is supported by towers on either bank and a tower near midriver; a privately maintained light is shown from the southeast leg of the middle tower.

Otter Point Creek, on the west side of Bush River 0.5 mile above the railroad bridge, has depths of 3 feet for 1 mile above the entrance.

Marinas in Otter Point Creek and on the eastern shore of the Bush River just above the bridge have slips, gasoline, and some marine supplies. Hull and engine repairs can be made; the largest haul-out capacities are: railway, 45 feet; lift, 12 tons.

Still Pond (39°20′25″N., 76°08′30″W.), a bight on the southeast side of Chesapeake Bay 154.7 miles above the Virginia Capes, has general depths of 9 to 11 feet and is a good anchorage for small craft during easterly winds. **Churn Creek,** which empties into the southwest corner of the bight, has depths of 2 feet in the very narrow entrance and deeper water inside.

Stillpond Creek, at the southeast corner of the bight, is entered through a narrow privately dredged channel. In April 1980, it was reported that drafts up to 4½ feet could be carried through the entrance channel. A light and buoys mark the entrance channel. The channel inside Stillpond Creek is marked by a daybeacon and buoys. Stillpond Creek entrance channel is subject to frequent shoaling; local knowledge is advised.

Stillpond Coast Guard Station is on the north side of the entrance to Stillpond Creek.

A flashing red light is shown on **Meeks Point,** on the north side of Still Pond, at night when firing is in progress within the restricted and dangerous water areas of the Aberdeen Proving Ground complex. (See **334.140,** chapter 2, for limits and regulations of the **restricted area.**)

Sassafras River joins Chesapeake Bay from eastward 159 miles above the Virginia Capes. The entrance is between **Howell Point,** marked by a light, and **Grove Point,** 3.5 miles east-northeastward; the entrance width normal to the chan-

nel is about 1 mile. The river is used by vessels drawing up to 12 feet, but the usual draft is 6 feet or less.

The river channel has depths of 13 feet, or more to a point 1 mile above the Fredericktown-Georgetown bridge, thence 7 to 3 feet for another 2 miles. The channel is broad and straight for the first 4 miles, then is narrow and crooked in places, but is marked as far as the highway bridge 10 miles above the mouth. The mean range of tide is 1.6 feet at Betterton and 2 feet at Georgetown. In 1967, the following depths were reported in the river channel: a shoal covered 1 foot or less in 39°22′13″N., 75°58′58″W.; 6 feet in 39°21′50″N., 75°54′40″W.; and 10 feet in 39°21′46″N., 75°53′26″W.

Betterton is a village on the south side of Sassafras River 2 miles eastward of Howell Point. The principal wharf has depths of 9 feet at the outer end. Excursion boats from Baltimore call at the wharf during the summer. Gasoline and some supplies are available in the summer.

Turner Creek, on the south side of Sassafras River 4.5 miles above the mouth, has depths of at least 7 feet in the very narrow entrance and 5 feet for 0.6 mile upstream. The entrance is marked by a seasonal buoy. The creek has several small landings along its shores and is much traveled by local pleasure boats.

Kentmore Park is a small community on the south side of Sassafras River 5 miles above the mouth. The community wharf has depths of 7 feet at the upper end.

Fredericktown, on the north side, and **Georgetown,** on the south side of Sassafras River 10 miles above the mouth, are connected by a highway bridge that has a 40-foot bascule span with a clearance of 4 feet. The bridgetender monitors VHF-FM channel 16 and works on channels 13 and 68; call sign KYU-699. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) In August 1984, a replacement highway bascule bridge with design clearances of 40 feet horizontal and 5 feet vertical was under construction adjacent upstream. Many yachts and pleasure craft harbor here. The **speed limit** is 6 miles per hour in Sassafras River in an area extending about 0.5 mile above and 0.5 mile below the highway bridge.

There are numerous small-craft facilities on both sides of the river just below the bridge.

The unmarked channel in Sassafras River above the bridge is narrow in places and difficult to follow without local knowledge. A marina on the south side of the river 1 mile above the bridge has gasoline and some supplies; an 18-ton lift can haul out boats for hull and engine repairs.

Spesutie Narrows (39°25.2′N., 76°05.7′W.), on the northwest side of Chesapeake Bay 159 miles above the Virginia Capes, is between the mainland and **Spesutie Island,** close to the eastward. A privately dredged channel leads from the flats off the southern entrance into and along the narrows to a basin at the Army landings at Mulberry Point. In July 1982, the controlling depth was 5 feet to the basin with 2½ to 5 feet at the landings. The entrance channel is marked by buoys and privately maintained lighted ranges, and the inner channel is marked by daybeacons.

The upper end of the narrows is closed by a solid-fill causeway.

Spesutie Island and Spesutie Narrows are within the Aberdeen Proving Ground complex constituting prohibited land areas and restricted and dangerous contiguous water areas. A flashing red light is shown at night on **Mulberry Point,** on the west side of Spesutie Narrows, 1 mile above the south entrance, when firing is in progress. (See **334.140,** chapter 2, for limits and regulations of the restricted area.)

Elk River, on the east side of Chesapeake Bay 162 miles above the Virginia Capes, is the approach to the Chesapeake and Delaware Canal, which is described in chapter 7. The entrance to the river is between **Grove Point** and **Turkey Point,** 3 miles north-northeastward; the latter point is a thinly wooded bluff with abrupt slopes at the south end. A light is shown from a white tower on the bluff. The entrance width normal to the channel is about 1 mile.

A **special anchorage** is on the east side of Turkey Point in **Jacobs Nose Cove.** (See **110.1 and 110.71,** chapter 2, for limits and regulations.)

The mean range of tide is 2.1 feet at the entrance to Elk River and 2.3 feet at the head. The current velocity is 0.8 knot.

Local magnetic disturbance.–Differences of 3° to 8° from normal variation have been observed in Elk River channel from Grove Point to Courthouse Point.

Bohemia River, on the east side of Elk River 5 miles above the mouth, has depths of 7 feet or more for 4 miles to the junction of **Great Bohemia Creek** and **Little Bohemia Creek,** thence 6 to 4 feet for 1.5 miles in Great Bohemia Creek and 7 feet for 1 mile in Little Bohemia Creek. The channel is broad and easy to follow for 2 miles above the entrance, then becomes very narrow and crooked. In August 1980, shoaling to an unknown extent was reported in the entrance to the Bohemia River in about 39°28′45″N., 75°56′13″W.

The cove on the southwest side of Bohemia River 3 miles above the entrance has depths of 3 to 5 feet and is much used as a small-boat anchorage.

A highway bridge 3.6 miles above the mouth of Bohemia River has a 40-foot bascule span with a clearance of 12 feet. (See **117.1 through 117.59 and 117.545,** chapter 2, for drawbridge regulations.) The **speed limit** is 6 miles per hour from the highway bridge to a point about 1 mile downstream in Bohemia River.

There are several small-craft facilities along the north side of Bohemia River, about 1.5 miles above the entrance, and along the south side of the river below the bridge.

Old Town Point Wharf, on the southeast side of Elk River 7 miles above the mouth, has depths of 10 feet at the outer end. This is a Government wharf and a vessel identification and monitoring station for the west end of the Chesapeake and Delaware Canal.

Back Creek, on the east side of Elk River 9 miles above the mouth and 171.4 miles above the Virginia Capes, is the route of the Chesapeake and Delaware Canal and has been described in chapter 7.

Above Back Creek, the natural channel in Elk River is marked by private buoys to just above **Locust Point** (39°33′54″N., 75°50′56″W.). Depths in the narrow crooked channel vary considerably, ranging from about 10 feet at the south end to about 1 foot off Locust Point; the chart is a guide. In 1978, a depth of 1 foot was reported to be available in the winding channel above Locust Point. For a distance of about 0.4 mile northward of Locust Point and about 0.2 mile southward of **Whitehall Point,** the channel is reported to be marked by private stakes. Mariners bound for Elkton are advised to seek local knowledge when transiting the channel.

Small-craft facilities are on both sides of Elk River 5 miles above Old Town Point Wharf.

Big Elk Creek, on the east, and **Little Elk Creek,** on the west, have depths of 3 feet to the fixed highway bridges 0.6 and 0.4 mile above their respective mouths. The channels in each are narrow and crooked with numerous snags and shoals that are unmarked. Extreme caution is advised beyond the junction. **Elkton,** between the creeks and 16 miles above the mouth of Elk River, is on the main line of the Penn Central Railroad and has several industrial plants.

The natural channel of Chesapeake Bay turns northward off the mouth of Elk River and splits into two branches between Turkey Point and Spesutie Island, 2.3 miles to the westward. One branch rounds Spesutie Island and continues northward to Susquehanna River; the other hugs the west side of Turkey Point and high thickly wooded **Elk Neck,** and continues to Northeast River. The flats between the two branches are very shallow, and large areas bare at low water.

Storm warning signals are displayed. (See chart.)

Fishing Battery Light (39°29.7′N., 76°05.0′W.), 38 feet above the water, is shown from a black skeleton tower on the battery on the east side of the channel leading to Susquehanna River; the light is 167.1 miles above the Virginia Capes. Near the light are a house and a few trees. A shallow channel leads from the main channel to a basin on the west side of the light.

Swan Creek, on the western shore of Chesapeake Bay opposite Fishing Battery Light, has depths of 4 feet in the entrance and 3 to 10 feet inside for about 2 miles. The creek is little used except by boats of the U.S. Army. An overhead power cable with a clearance of 32 feet crosses the northern part of the creek.

Susquehanna River empties into the head of Chesapeake Bay from northwestward 170.1 miles above the Virginia Capes. The entrance is between **Concord Point** and **Perry Point,** 1 mile east-northeastward. A marked dredged channel leads through the flats from deep water in Chesapeake Bay to Havre de Grace. A side channel leads to a basin at City Park at Havre de Grace. In July 1982, the controlling depth was 9½ feet to the mouth of Susquehanna River at Havre de Grace. In 1979, a controlling depth of 3½ feet was reported in the side channel to the basin at City Park at Havre de Grace, however, in 1980, the north side of the side channel was reported to have shoaled to bare; local knowledge is advised. In 1972–1973, a depth of 4 feet was available in the basin. The mean range of tide is 1.8 feet at Havre de Grace and 2.1 feet at Port Deposit. It is reported that the river is usually closed by ice for a few weeks during the winter, but ice gorges and freshets are infrequent because of the dams upstream.

seaplane landing area is in the middle of the entrance to Susquehanna River; mariners are advised to use caution.

Havre de Grace, on the west side of the entrance to the Susquehanna River, is on the main lines of Amtrak and the Baltimore and Ohio Railroad. The town has little waterborne commerce, but many pleasure craft base here; most of the wharves are in poor condition. The oil wharf just above the first bridge has depths of about 13 feet alongside.

A rock covered 6 feet and marked by buoys on the east, west, and south sides, is about 200 yards off the Havre de Grace wharves and 500 yards below the drawspan of the first bridge. There are said to be several other rocks between this rock and the wharves that require local knowledge to avoid. In 1967, a sunken rock was reported just north of the first bridge in 39°33′20″N., 76°04′58″W., about 200 yards east-northeastward of the charted rock.

The railroad bridge 0.8 mile above the mouth has a swing span with a clearance of 52 feet. (See **117.1 through 117.59 and 117.575,** chapter 2, for drawbridge regulations.) The overhead power cable on the lower side of the bridge has a clearance of 127 feet. Stone piers of a former highway bridge, just below the railroad bridge, stand 15 feet above high water. The remaining three fixed bridges between Havre de Grace and Port Deposit have minimum clearance of 86 feet.

There are berthing and repair facilities for small craft at Havre de Grace. One of the basins is protected by old railroad barges sunk in place.

Perryville, on the opposite side of the river from Havre de Grace, has berthing facilities for small craft above the first bridge. Gasoline and some marine supplies are available; largest lift for hauling out boats is 13 tons.

Above Havre de Grace, depths of 13 feet to 50 feet are in the channel of Susquehanna River to Port Deposit, on the northeast side 4 miles above the mouth; the river is obstructed by rocks above this point. In 1977, rocks were reported in about 39°35.8′N., 76°07.2′W., about 3.6 miles above the mouth.

Garrett Island, 0.8 mile long and 0.4 mile broad, high and wooded, is in midriver 1 mile above the mouth. The favored channel is west of the island, however, mariners are advised to use caution because of the numerous rocks, shoals, logs, and submerged pilings in this area.

Port Deposit has a large manufacturing company that builds barges, derricks, and boats. The marinas at the south end of the town have berthing and engine repair facilities; largest lift, 12 tons. Gasoline and some supplies are available.

Conowingo Dam is about 10 miles above the mouth of the Susquehanna River.

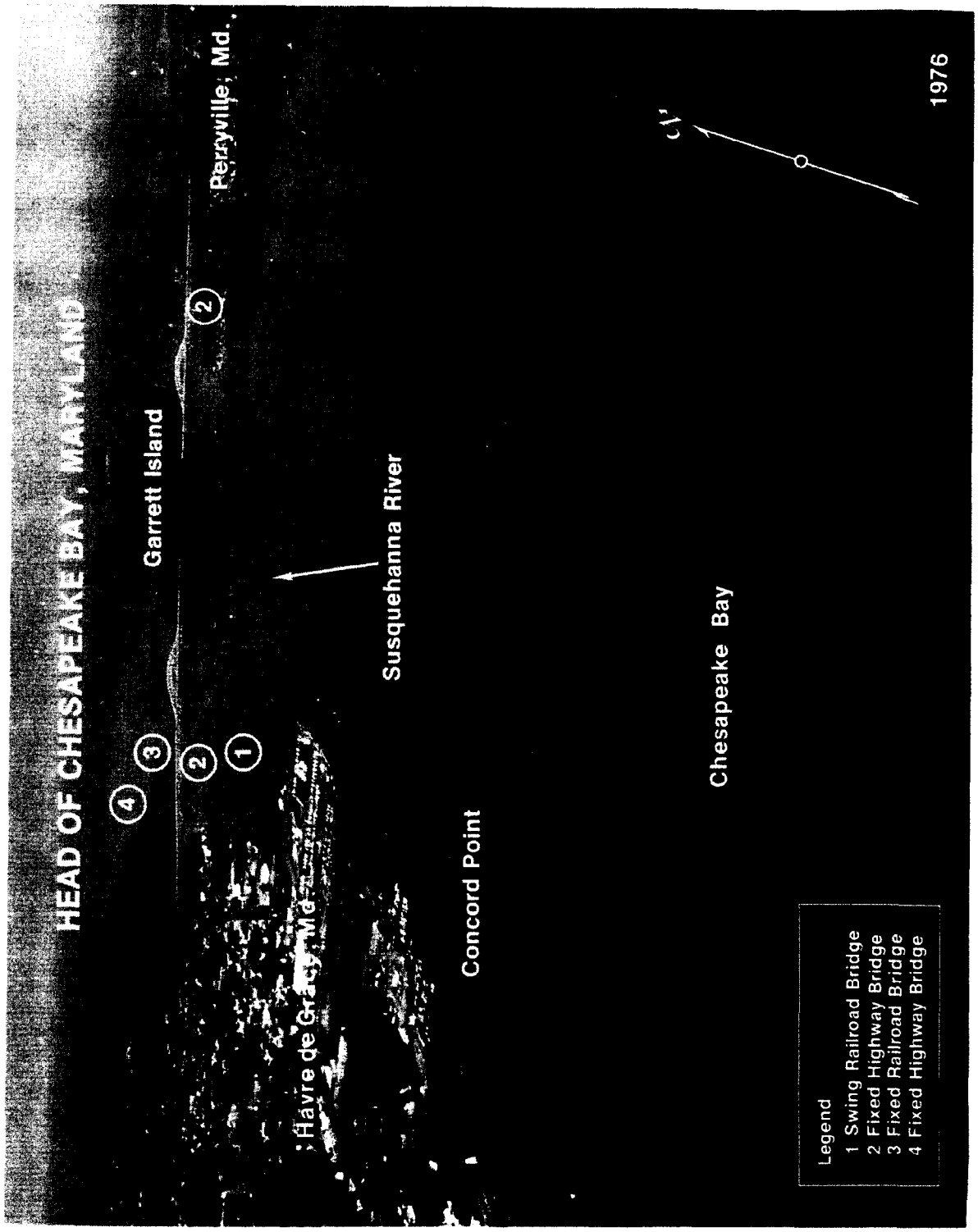
North East River empties into the head of Chesapeake Bay 4.5 miles eastward of Susquehanna River and 169.1 miles above the Virginia Capes. The entrance is between **Red Point,** which is 5 miles north-northeastward of Turkey Point, and **Carpenter Point,** on the west. The commercial traffic on the river is in seafood products and gravel shipped by barges; yachtsmen use it extensively.

The controlling depth from the entrance to within 1 mile of a dam at the head of navigation was 2 feet at midchannel in July 1978. The channel is well marked for most of its length. The mean range of tide is 1.9 feet.

Extensive small-craft facilities are at **Hance Point,** on the east side of North East River 2 miles above the mouth; at **Charlestown,** on the west side 2.5 miles above the mouth; and at **Northeast Heights,** on the east side 3 miles above the mouth.

A **special anchorage** is westward of Northeast Heights. (See **110.1 and 110.70a,** chapter 2, for limits and regulations.)

North East, at the head of navigation 4.5 miles above the mouth of North East River, has good rail and highway connections. In 1983, the controlling depths were 5 feet in the dredged channel leading to the basin at North East and 3½ to 6 feet in the basin, except for shoaling to 2 feet in the north corner. Gasoline and some supplies are available at a few of the fish piers.


HEAD OF CHESAPEAKE BAY, MARYLAND
Havre de Grace, Md.
Garrett Island
Perryville, Md.
Susquehanna River
Concord Point
Chesapeake Bay
1976
Legend
1 Swing Railroad Bridge
2 Fixed Highway Bridge
3 Fixed Railroad Bridge
4 Fixed Highway Bridge

APPENDIX

Sales Information.–National Ocean Service publications and nautical charts are sold by NOS and its authorized sales agents in many U.S. ports and in some foreign ports. Mail orders should be addressed to

National Ocean Service, Distribution Branch (N/CG33), 6501 Lafayette Avenue,

Riverdale, MD 20737-1199, and accompanied by a check or money order 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 sales offices at Distribution Branch, Riverdale (see address above), and at 701 C Street, Box 38, Anchorage, Alaska 99513.

National Ocean Service Offices

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.

Rockville: Director, Charting and Geodetic Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, MD 20852-3806.

Norfolk: Director, Atlantic Marine Center, National Ocean Service, NOAA, 439 West York Street, Norfolk, VA 23510-1114.

Seattle: Director, Pacific Marine Center, National Ocean Service, NOAA, 1801 Fairview Avenue East, Seattle, WA 98102-3767.

Charts and Publications-National Ocean Service

Nautical Charts (See Chart Catalogs)

United States Coastal and Intracoastal waters, and possessions.

Great Lakes, Lake Champlain, New York State Canals, and the St. Lawrence River-St. Regis to Cornwall, Canada.

Publications (See Chart Catalogs for latest editions and prices)

Coast Pilots

U.S. Coast Pilot 1, Atlantic Coast, Eastport to Cape Cod.

U.S. Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook.

U.S. Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry.

U.S. Coast Pilot 4, Atlantic Coast, Cape Henry to Key West.

U.S. Coast Pilot 5, Atlantic Coast-Gulf of Mexico, Puerto Rico, and Virgin Islands.

U.S. Coast Pilot 6, Great Lakes, Lakes Ontario, Erie, Huron, Michigan and Superior, and St. Lawrence River.

U.S. Coast Pilot 7, Pacific Coast, California, Oregon, Washington, and Hawaii.

U.S. Coast Pilot 8, Pacific Coast Alaska, Dixon Entrance to Cape Spencer.

U.S. Coast Pilot 9, Pacific and Arctic Coasts, Alaska-Cape Spencer to Beaufort Sea.

Distance Tables

Distances Between United States Ports.

Tide Tables

Europe and West Coast of Africa.

East Coast, North and South America.

West Coast, North and South America.

Central and Western Pacific Ocean and Indian Ocean.

Supplemental Tidal Predictions–Anchorage, Nikiski, Seldovia, and Valdez, Alaska.

Tidal Current Tables

Atlantic Coast, North America.

Pacific Coast, North America and Asia.

Tidal Current Charts

Boston Harbor.

Narragansett Bay to Nantucket Sound.

Narragansett Bay.

Long Island Sound and Block Island Sound.

New York Harbor.

Delaware Bay and River.

Upper Chesapeake Bay.

Charleston Harbor, S.C., including the Wando, Cooper, and Ashley Rivers.

Tampa Bay.

San Francisco Bay.

Puget Sound, Northern Part.

Puget Sound, Southern Part.

Tidal Current Diagrams

Boston Harbor.

Long Island Sound and Block Island Sound.

New York Harbor.

Upper Chesapeake Bay.

Charts and Publications-Other U.S. Government Agencies

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, Mastercard or Choice by calling (202) 783-3238 during normal business hours.

Defense Mapping Agency Procurement Information.-Publications and charts of the Defense Mapping Agency Hydrographic/Topographic Center are available from Defense Mapping Agency Combat Support Center (Code DDCP), Washington, DC 20315-0020 and its sales agents.

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.

Nautical Charts

U.S. Waters:

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.

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.

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.

Charts of the Illinois Waterway, from Mississippi River at

Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

Marine Weather Services Charts: Published by the National Weather Service; for sale by NOS Distribution Branch (see Sales Information above).

Publications

Notices to Mariners:

The Local Notice to Mariners is available without charge upon application to the appropriate Coast Guard District Commander (see address further on). The Defense Mapping Agency Notice to Mariners is available without charge by operators of ocean-going vessels (see Defense Mapping Agency Procurement Information above).

Special Notice to Mariners are published annually in Defense 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.

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.)

List of Lights (Foreign Countries): Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

Sailing Directions (Foreign Countries): Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

Radio Navigational Aids, Pub. 117: Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

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, early this appendix.)

American Practical Navigator (Bowditch) (Pub. 9): Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

International Code of Signals (Pub. 102): Published by Defense Mapping Agency Hydrographic/Topographic Center (see Defense Mapping Agency Procurement Information above).

Selected Worldwide Marine Weather Broadcasts: Published by National Weather Service; for sale by the Government Printing Office. (See Government Printing Office, early this appendix.)

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.)

Official U.S. Coast Guard Recreational Boating Guide (CG-340): Published by U.S. Coast Guard; for sale by the Government Printing Office. (See Government Printing Office, early this appendix.)

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.

Marine Radiotelephone Users Handbook: Published and sold by Radio Technical Commission for Maritime Services, 655 Fifteenth Street, N.W., Suite 300, Washington, DC 20005-5701.

Corps of Engineers Offices

New York District: 26 Federal Plaza, New York, N.Y. 10278-0090. Coastal and tributary waters from Sandy Hook, N.J. to a point just north of Manasquan Inlet.

Philadelphia District: U.S. Customhouse, Second and Chestnut Streets, Philadelphia, Pa. 19106-2991. Coastal and tributary waters from a point just north of Manasquan Inlet to the Maryland boundary including Delaware Bay and River, Elk River, and the Chesapeake and Delaware Canal.

Baltimore District: 31 Hopkins Plaza, Baltimore, MD 21203-1717. Susquehanna River, Potomac River, District of Columbia, southwest part of Delaware, that part of Chesapeake Bay north of Smith Point, Maryland, on the western shore and including that part of Maryland between Chesapeake Bay and Atlantic Ocean.

Norfolk District: 803 Front Street, Norfolk, Va. 23510-1096. Coastal and tributary waters of Virginia including the Chesapeake Bay and its tributaries south of Pocomoke River on the eastern shore and south of Smith Point, Virginia, on the western shore except for Little Wicomico River, Virginia. Chowan River Basin downstream to and including the mouth of Meherrin River. The Albemarle and Chesapeake Canal within the State of Virginia and the Great Dismal Swamp Canal to Albemarle Sound.

Environmental Protection Agency (EPA) Offices.–Regional offices and States in the EPA coastal regions:

Region I (New Hampshire, Vermont, Maine, Massachusetts, Connecticut, Rhode Island): J. F. Kennedy Federal Bldg. Boston, Mass. 02203.

Region II (New Jersey, New York, Puerto Rico, Virgin Islands): 26 Federal Plaza, New York, N.Y. 10278.

Region III (Delaware, Maryland, Virginia, District of Columbia, Pennsylvania): 841 Chestnut Street, Philadelphia, Pa. 19107.

Region IV (Alabama, Florida, Georgia, Mississippi, South Carolina, North Carolina): 345 Courtland Street, NE., Atlanta, Ga. 30365.

Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin): 230 South Dearborn Street, Chicago, Ill. 60604.

Region VI (Louisiana, Texas): First International Bldg., 1201 Elm Street, Dallas, Tex. 75270.

Region IX (California, Hawaii, Guam): 215 Fremont Street, San Francisco, Calif. 94105.

Region X (Alaska, Oregon, Washington): 1200 Sixth Avenue, Seattle, Wash. 98101.

Coast Guard Headquarters

Commandant, U.S. Coast Guard, Transpoint Bldg., 2100 Second Street SW., Washington, DC 20593-0001.

Coast Guard District Offices

Commander, First Coast Guard District, 408 Atlantic Avenue, Boston, MA, 02210-2209. Maine; New Hampshire; Vermont; Massachusetts; Rhode Island; Connecticut; New York except that part north of latitude 42°N. and 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°27′W. north west to the New York, New Jersey, and Pennsylvania boundaries at Tristate.

Commander, Fifth Coast Guard District, Federal Building, 431 Crawford Street, Portsmouth, VA 23705-5004. Delaware; Maryland; Virginia; District of Columbia; North Carolina; that portion of New Jersey south of 39°57′N. latitude, west of 74°27′W. longitude, and southwest of a line extending northwesterly from 39°57′N., 74°27′W. to the New York, New Jersey, and Pennsylvania boundaries at Tristate; that portion of Pennsylvania east of a line drawn along 78°55′W., south to 41°00′N., thence west to

79°00'W., and thence south to the Pennsylvania-Maryland boundary; the ocean area encompassed by a line bearing 122° T from the New Jersey shoreline at 39°57'N. (in the vicinity of Tom's River, New Jersey) to 36°43'N., 67°30'W.; thence along a line bearing 219° T to the point of intersection with a line bearing 122° T from the shoreline at the North Carolina—South Carolina border; thence northwesterly along this line to the coast.

Note.–A Marine Safety Office combines the functions of the Captain of the Port and Marine Inspection Office.

The symbol (D) preceding an office indicates that a Documentation Office is at the same address.

Coast Guard Marine Safety Offices

Baltimore, MD: Customhouse, South Gay and Lombard Streets, 21202-4022.

(D) Hampton Roads, Norfolk, VA: Norfolk Federal Bldg., 200 Granby Mall 23510-1888.

Coast Guard Captains of the Port

Philadelphia Captain of the Port, U.S. Coast Guard Base, Gloucester City, NJ 08030-9999.

Coast Guard Marine Inspection Offices

(D) Philadelphia, PA: U.S. Customhouse, Second and Chestnut Streets 19106-2974.

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, communication, 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 VHF-FM 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.

New Jersey:

Sandy Hook (40°28.2'N., 74°00.8'W.). On the bay side, 0.5 mile south of the point of the hook.

Shark River (40°11.3'N., 74°00.8'W.). About 500 yards west of the entrance, on the north side of Shark River Inlet.

Manasquan Inlet (40°06.2'N., 74°02.2'W.). Quarter mile west of inlet entrance, south side.

Barnegat (39°45.5'N., 74°06.4'W.). On Long Beach at Barnegat City, 0.5 mile south-southeast of abandoned light tower.

Beach Haven (39°33.1'N., 74°15.1'W.). At Beach Haven, 3 miles north of Beach Haven Inlet.

Atlantic City (39°22.7'N., 74°25.4'W.). Near Absecon Inlet entrance, on north side of Clam Creek opposite Gardiner Basin.

Great Egg (39°17.7'N., 74°33.8'W.). Inside Great Egg Harbor Inlet at Ocean City, 0.4 mile southward of bridge.

Townsend Inlet (39°07.7'N., 74°42.6'W.). North side of the inlet, 2.3 miles southwest of Ludlum Beach Light (manned during summer months only).

Cape May (38°56.9'N., 74°53.4'W.). On the south side of Cape May Harbor.

Cape May Air Station (38°56.9'N., 74°53.4'W.). Adjacent to Cape May Coast Guard Station.

Gloucester City Base (39°53.9'N., 75°07.7'W.). On the east side of Delaware River, 700 yards south of Walt Whitman Bridge.

Delaware:

Indian River Inlet (38°36.6'N., 75°04.1'W.). On the north shore inside the inlet.

Maryland:

Ocean City (38°19.7'N., 75°05.4'W.). On Philadelphia Avenue between South Division and Worcester Streets.

Crisfield (37°58.5'N., 75°51.5'W.). Aids to Navigation Team on the south side of Somers Cove.

Still Pond (39°20.1'N., 76°07.9'W.). On the north side of the entrance to Stillpond Creek.

Baltimore (39°11.9'N., 76°34.2'W.). At Curtis Bay Coast Guard Yard in Arundel Cove.

Annapolis (38°55.3'N., 76°28.4'W.). On the west side of Fishing Creek, about 1 mile northwestward of Thomas Point.

Taylors Island (38°28.5'N., 76°17.2'W.). A houseboat moored about 1.6 mile south of Hooper Point in Slaughter Creek.

St. Inigoes (38°09.4'N., 76°25.7'W.). On west side of entrance to Molls Cove.

Virginia:

Chincoteague (37°55.8'N., 75°23.0'W.). On the east side of Chincoteague Channel, 0.3 mile south of the bridge.

Parramore Beach (37°34.4'N., 75°37.0'W.). On the west side of Parramore Island, about 0.5 mile south of Wachapreague Inlet.

Cape Charles (37°15.9'N., 76°00.9'W.). On spit between Mud Creek and Harbor of Refuge.

Milford Haven (37°29.3'N., 76°18.4'W.). About 0.4 mile eastward of Narrows Point.

Little Creek (36°54.7'N., 76°10.7'W.). About 1 mile south of the entrance to Little Creek, 4.5 miles west of Lynnhaven Inlet.

Portsmouth (36°53.0'N., 76°21.2'W.). On the west side of the entrance to Craney Island Creek.

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 Puerto Rico and the U.S. Virgin Islands. Transmissions are as follows:

Urgent and safety broadcasts:

(1) **By radiotelegraph:** (a) Upon receipt, except within 10 minutes of the next silent period, for urgent messages only; (b) during the last 15 seconds of the first silent period after receipt; (c) repeated at the end of the first silent period which occurs during the working hours of one-operator ships unless the original warning has been cancelled or superseded by a later warning message.

(2) **By radiotelephone:** (a) upon receipt; (b) repeated 15 minutes later, (for urgent messages only); (c) text only on the first scheduled broadcast unless cancelled; (d) additional broadcasts at the discretion of the originator.

(3) Urgent broadcasts are preceded by the urgent signal; XXX for radiotelegraph; PAN for radiotelephone. Both the urgent signal and message are transmitted on 500 kHz, 2182 kHz, and VHF-FM channel 16. Safety broadcasts are preceded by the safety signal: TTT for radiotelegraph; SECURITY for radiotelephone. After the preliminary signal on 500 kHz and 2182 kHz, the station shifts to its assigned working medium frequency for the radiotelegraph broadcast and 2670 kHz for the radiotelephone transmission. Those stations broadcasting on VHF will announce on channel 16, shifting to channel 22.

Scheduled broadcasts.–The following Coast Guard radio stations make scheduled broadcasts, preceded by a preliminary call on 500 kHz, 2182 kHz, and VHF-FM channel 16, at the times and frequencies indicated:

Radiotelegraph:

NMN, Portsmouth, Va., 448 kHz, 1020 and 1920 e.s.t.

Radiotelephone:

NMX, Baltimore, Md.,
VHF-FM channel 22A, 0705 and 2030 e.s.t.
NMK, Cape May, N.J., 2670 kHz and

VHF-FM channel 22A, 0603 and 1803 e.s.t.
NMN-70, Chincoteague, Va., 2670 kHz, 0903 and 2133 e.s.t.;
VHF-FM channel 22A, 0645 and 2100 e.s.t.
NMN-80, Hampton Roads, Va., 2670 kHz, 0833 and 2103 e.s.t.;
VHF-FM channel 22A, 0620 and 2130 e.s.t.
NMY-41, Shinnecock, N.Y., 2670 kHz and
VHF-FM channel 22A, 0720, and 1920 e.s.t.

Customs Ports of Entry and Stations

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.

Northeast Region

Philadelphia District:

Ports of Entry: Philadelphia, Chester, Pa., Wilmington, Del.

Baltimore District:

Ports of Entry: Baltimore, Annapolis, Cambridge, Crisfield, Md.

Customs Station: Salisbury (supervised by Baltimore port of entry).

Southeast Region

Washington District:

Ports of Entry: Washington, D.C., Alexandria, Va.

Norfolk District:

Ports of Entry: Norfolk, Newport News,

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:

Atlantic City, N.J.: National Aviation Facilities Experimental Center, Bldg. 301, Pomona, N.J.

Baltimore, Md.: Baltimore-Washington International Airport.

Norfolk, Va.: Norfolk International Airport.

Patuxent River, Md.: Naval Air Station, Bldg. 103.

Philadelphia, Pa.: Federal Bldg., 600 Arch Street, and Philadelphia International Airport.

Richmond, Va.: R. E. Byrd International Airport.

Trenton, N.J.: Federal Bldg., 402 East State Street.

Wallops Island, Va.: Wallops Flight Center.

Wilmington, Del.: Greater Wilmington Airport, New Castle, Del.

Radio Weather Broadcasts.– Taped or direct broadcasts of marine weather forecasts and storm warnings are made by commercial and Coast Guard radio stations in the area covered by this Coast Pilot. These broadcasts usually are made several times a day; the transmission schedules are shown on the Marine Weather Services Charts for the following areas:

Montauk Point, N.Y., to Manasquan, N.J.

Manasquan, N.J., to Cape Hatteras, N.C.

The weather broadcast schedules of Coast Guard radio stations are also listed in the description of Coast Guard marine services found elsewhere in this appendix.

NOAA Weather Radio.–National Weather Service VHF-FM radio stations provide mariners with continuous FM broadcasts of weather warnings, forecasts, radar reports, and selected weather observations. These stations usually transmit on 162.55 or 162.40 MHz. Reception range is usually up to 40 miles from the antenna site, depending on 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:

KWO-35, New York, N.Y., 162.55 MHz. (40°46′N., 73°59′W.)

KIH-28, Philadelphia, Pa., 162.475 MHz. (40°43′N., 73°58′W.)

KIH-28, Philadelphia, Pa., 162.475 MHz. (40°03′N., 75°14′W.)

KHB-38, Atlantic City, N.J., 162.40 MHz. (39°22′N., 74°26′W.)

WXJ-94, Lewes, Del., 162.55 MHz. (38°47′N., 75°09′W.)

KEC-83, Baltimore, Md., 162.40 MHz. (39°23′N., 76°43′W.)

KHB-36, Washington, D.C., 162.55 MHz. (38°38′N., 77°26′W.)

KEC-92, Salisbury, Md., 162.475 MHz. (38°30′N., 75°38′W.)

WXM-57, Heathsville, Va., 162.40 MHz. (37°54′N., 76°28′W.)

KHB-37, Norfolk, Va., 162.55 MHz. (36°48′N., 76°28′W.)

WXK–65, Richmond, Va., 162.475 MHz. (37°30′N., 77°32′W.)

National Weather Service Forecast Offices (WSFOs).–Scheduled coastal marine forecasts are issued four times daily by Weather Service Forecast Offices. (See National Weather Service, chapter 1, for further details.) Individual WSFOs and their specific areas of broadcast coverage are as follows:

Philadelphia, Pa.: (1) From Manasquan, N.J. to but not including Cape Henlopen, out 20 miles; (2) Delaware Bay.

Washington, D.C.: (1) Chesapeake Bay (a) Baltimore Harbor, northward, (b) Baltimore Harbor to Patuxent River, (c) Patuxent River to Windmill Point, (d) South of Windmill Point; (2) Tidal Potomac Point; (3) Cape Henlopen to and including Virginia Beach, out 20 miles.

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:

Norfolk, Va.: Norfolk International Airport 23518.

Public Health Service Quarantine Stations.–Stations where quarantine examinations are performed:

Washington, D.C.: U.S. Quarantine Station, P.O. Box 17329, Dulles International Airport, Washington, D.C. 20041.

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.

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.

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, Regulatory Services Staff, Room 643, telephone 301-436-8247; for animal products, Import-Export Animals and Products

Staff, Room 838, telephone 301-436-8499; and for live ruminants, swine, equines, and poultry and other birds, Veterinary Services, Import-Export Animals and Products Staff, Room 838, telephone 301-436-8170.

Delaware:

Wilmington: Federal Bldg., Room 1218A, 844 King Street 19801.

District of Columbia:

Washington: Dulles International Airport, Chantilly, Virginia 20041.

Maryland:

Baltimore: Appraisers Stores Bldg., Room 506, 103 South Gay Street 21202.

Pennsylvania:

Philadelphia: 1004 Customhouse, Second and Chestnut Streets 19106.

Virginia:

Chantilly: Dulles International Airport 20041.

Newport News: P.O. Box 942, 23607.

Norfolk: Federal Bldg., Room 311, 200 Granby Mall 23510.

Animal Import Centers:

Honolulu, Hawaii: P.O. Box 50001, 96850.

Miami, Fla.: 8120 NW 53rd Street, Suite 102, 33166.

Rock Tavern, N.Y.: New York Animal Import Center, Stewart Airport, Rural Route 1, Box 74, 12575.

Immigration and Naturalization Service Offices

Philadelphia, Pa.: U.S. Courthouse, Room 1321, 601 Market Street 19106.

Baltimore, Md.: E.A. Garmatz Federal Bldg., 101 West Lombard Street 21201.

Washington, D.C.: 25 E Street NW. 20013.

Norfolk, Va.: Norfolk Federal Bldg., Room 439, 200 Granby Mall 23510.

Food and Drug Administration (FDA) Regional Offices

Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont): 585 Commercial Street, Boston, Mass. 02109.

Region II (New Jersey, New York, Puerto Rico): 830 Third Avenue, Brooklyn, N.Y. 11232.

Region III (Delaware, Maryland, Pennsylvania, Virginia): U.S. Customhouse, Room 900, 2nd & Chestnut Streets, Philadelphia, Pa. 19106.

Region IV (Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina): 60 Eight Street NE, Atlanta, Ga. 30309.

Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin): 20 N. Michigan Avenue, Chicago, IL 60602.

Region VI (Louisiana, Texas): 3032 Bryan Street, Dallas, Tex. 75204.

Region IX (California, Hawaii, Nevada): Federal Office Bldg., Room 568, 50 U.N. Plaza, San Francisco, Calif. 94102.

Region X (Alaska, Oregon, Washington, Idaho): Federal Office Bldg., Room 5003, 909 First Avenue, Seattle, Wash. 98174.

Federal Communications Commission Offices

District field offices

Philadelphia, Pa.: One Oxford Valley Office Bldg., Room 404, 2300 East Lincoln Highway, Langhorne 19047.

Baltimore, Md.: Federal Bldg., Room 1017, 31 Hopkins Plaza 21201.

Norfolk, Va.: Military Circle, 870 North Military Highway 23502.

Radio shore stations providing medical advice.–Messages to shore stations may be transmitted in code groups or plain language; messages should be signed by the master and be prefixed: "DH MEDICO". The following station maintains a continuous guard on 500 kHz. (See Medical advice, chapter 1.)

NMN, Portsmouth, Va., U.S. Coast Guard.

Measured Courses.–The positions of measured courses are shown on the chart and their description is included in the Coast Pilots when information is reported to the National Ocean Service. Courses are located in the following places covered by this Coast Pilot:

Brickhouse Bar, Chesapeake Bay; 12270

Curtis Point, Chesapeake Bay; 12270

Petersons Point, Patuxent River; 12264

Piney Neck Point, Prospect Bay; 12270

Rock Point, Patapsco River; 12278

Tuckerton Creek, New Jersey Intracoastal Waterway; 12316

The pages in the text describing the courses can be obtained by referring to the index for the geographic places; chart numbers follow the names.

CLIMATOLOGICAL TABLES

These tables were prepared by the National Environmental Satellite, Data, and Information Service. Station level pressure refers to the actual pressure taken at the elevation of the station. Where it has been reduced to sea level, the term sea level pressure is used. Time given is local standard time.

* means less than 0.5 percent.
** means less than 0.5 day.
t means trace (not measurable) of precipitation.

NEW YORK, NEW YORK (40°39'N., 73°47'W.) Elevation 13 ft. (4.0m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1018.0	1017.3	1015.1	1014.5	1015.8	1014.8	1015.5	1016.0	1018.3	1018.3	1017.2	1018.6	1016.6	16
TEMPERATURE (DEGREES F)														
Mean	31.4	32.2	39.3	49.9	59.8	69.5	75.1	73.6	67.0	57.3	46.5	34.9	53.1	30
Mean Daily Maximum	38.0	39.1	46.5	58.1	68.4	78.0	83.2	81.7	75.4	65.8	53.7	41.3	60.8	30
Mean Daily Minimum	24.8	25.2	32.1	41.7	51.1	60.9	66.9	65.4	58.6	48.7	39.3	28.4	45.3	30
Extreme Highest	65	65	72	87	99	99	104	98	94	84	76	68	104	14
Extreme Lowest	0	−2	7	26	34	45	55	46	40	25	20	5	−2	14
Minimum 32 Degrees F or Less, Mean Number of Days	23	22	13	2	0	0	0	0	0	**	5	19	85	13
RELATIVE HUMIDITY														
Average Percentage (0700 l.s.t.)	71	70	70	69	70	74	73	76	78	77	74	73	73	13
Average Percentage (1300 l.s.t.)	59	58	57	55	57	61	57	57	57	54	57	61	57	13
CLOUD COVER														
Average Amount (Tenths)	6.1	6.3	6.2	6.2	6.1	6.2	6.1	5.7	5.4	5.2	6.3	6.4	6.0	16
Mean Number of Days with Clear Skies	8	7	7	7	7	7	7	7	10	12	7	8	94	16
Mean Number of Days with Cloudy Skies	14	13	14	13	12	12	12	10	10	10	14	15	149	16
PRECIPITATION														
Mean Amount (Inches)	2.69	3.05	3.77	3.59	3.54	2.98	4.04	4.30	3.31	2.76	3.90	3.60	41.53	30
Greatest Amount (Inches)	5.77	5.48	7.93	6.98	6.14	6.70	8.48	17.41	9.60	6.41	9.51	6.16	49.86	27
Least Amount (Inches)	0.21	1.41	1.35	1.12	0.38	t	0.46	0.42	0.70	0.09	1.10	1.46	25.38	27
Maximum in 24 hrs. (Inches)	1.60	2.87	2.27	2.12	2.88	2.23	3.21	6.59	5.83	3.42	4.09	2.46	6.59	27
Mean Amount of Snow (Inches)	6.6	8.2	4.5	0.3	t	0.0	0.0	0.0	0.0	t	0.2	4.8	24.6	15
Maximum Snowfall in 24 hrs. (Inches)	13.0	19.9	8.1	3.2	t	0.0	0.0	0.0	0.0	0.5	2.1	8.2	19.9	16
Mean Number of Days with Snow (One Inch or More)	2	2	1	**	0	0	0	0	0	0	**	1	7	16
0.01 Inch or More of Rainfall, Mean Number of Days	10	10	11	11	11	10	9	9	8	7	11	11	117	16
WIND														
Mean Wind Speed (Knots) (0700 l.s.t.)	10.8	10.8	11.6	10.6	9.1	8.5	7.8	7.7	8.4	9.0	9.7	10.2		17
Mean Wind Speed (Knots) (1300 l.s.t.)	12.4	12.5	13.8	13.5	12.5	12.3	11.6	11.1	11.4	11.4	11.9	12.2		17
Direction (Percentage of Obs.): at 0700 l.s.t.														
North	9.0	7.4	7.0	8.6	7.4	8.5	8.4	9.5	11.2	10.3	8.3	8.9		17
North Northeast	5.3	7.3	6.7	8.4	7.8	8.4	7.4	10.9	10.2	12.9	6.0	6.6		17
Northeast	7.2	7.9	8.5	6.8	7.8	5.9	6.6	7.3	10.8	9.6	6.2	8.2		17
East Northeast	3.7	5.6	6.9	6.1	6.3	4.9	4.0	5.6	6.5	5.7	4.3	3.2		17
East	1.8	2.4	3.7	4.1	3.7	2.9	3.4	2.6	3.2	2.3	2.6	1.0		17
East Southeast	1.2	1.7	2.0	2.9	3.1	3.0	1.5	1.6	1.2	1.1	1.2	1.3		17
Southeast	0.4	1.3	1.6	2.5	2.8	2.9	1.8	2.3	1.7	1.0	2.0	1.1		17
South Southeast	1.5	2.1	2.2	5.0	4.2	3.7	1.8	2.5	2.4	0.9	2.2	1.7		17
South	4.0	3.2	3.4	6.9	8.6	10.9	6.9	6.4	4.4	2.8	4.6	2.8		17
South Southwest	5.6	3.9	4.3	4.5	6.7	8.1	10.6	6.9	5.6	4.6	4.6	4.9		17
Southwest	7.8	7.4	5.9	7.2	7.6	9.7	12.8	11.4	9.2	8.7	9.0	8.7		17
West Southwest	10.1	8.8	5.7	7.9	7.7	8.0	10.1	8.4	8.4	8.4	11.8	11.4		17
West	8.0	8.6	7.6	5.1	4.9	4.4	4.9	4.9	5.7	6.4	7.2	11.8		17
West Northwest	10.9	10.8	11.2	6.7	4.7	5.0	4.1	3.4	4.4	6.3	10.1	10.9		17
Northwest	11.8	12.4	13.4	9.0	7.4	5.7	6.2	6.3	5.8	8.4	10.3	9.9		17
North Northwest	9.9	7.9	8.4	6.6	6.5	6.3	6.7	6.6	7.2	7.2	6.9	6.1		17
Calm	1.8	1.2	1.6	1.6	2.6	1.8	2.8	3.5	2.3	3.5	2.7	1.3		17
Direction (Percentage of Obs.): at 1300 l.s.t.														
North	6.9	6.3	6.6	4.5	3.3	3.7	3.7	4.0	6.7	6.0	4.6	6.6		17
North Northeast	4.2	5.3	4.9	4.4	2.7	2.2	2.9	4.4	4.4	5.5	4.2	4.4		17
Northeast	4.6	4.0	4.3	3.9	3.2	1.8	2.2	3.4	5.4	7.0	3.7	4.8		17
East Northeast	2.8	3.4	4.5	2.1	3.2	1.6	1.4	2.8	4.8	3.1	1.9	3.4		17
East	2.2	3.3	2.8	3.8	2.7	2.9	2.0	2.6	2.6	3.3	2.6	2.4		17
East Southeast	1.8	2.8	4.2	4.5	6.8	3.6	3.2	3.4	2.9	2.8	2.6	1.7		17
Southeast	1.7	2.2	3.2	5.3	7.6	7.8	5.6	5.4	3.7	3.8	3.9	1.7		17
South Southeast	2.7	4.7	4.7	12.7	13.2	13.7	14.2	10.3	10.0	7.1	4.8	2.8		17
South	5.2	7.3	9.9	14.6	19.0	25.0	26.9	24.9	20.5	12.7	8.2	6.0		17
outh Southwest	7.3	7.2	5.9	6.8	9.3	11.0	13.7	13.1	8.9	10.6	8.4	6.9		17
Southwest	9.2	8.3	5.3	5.5	5.1	6.5	8.0	6.6	7.0	9.6	11.7	11.6		17
West Southwest	8.7	7.5	7.3	4.8	3.9	4.1	3.5	4.2	4.4	4.7	8.6	10.2		17
West	9.4	9.0	6.5	7.0	3.9	2.8	2.6	3.2	2.8	3.8	8.0	9.2		17
West Northwest	13.0	10.6	10.1	7.1	5.0	3.9	3.5	3.9	4.1	5.4	10.2	10.5		17
Northwest	11.4	12.0	11.9	8.0	4.6	4.6	3.0	3.7	6.0	7.4	9.3	10.0		17
North Northwest	8.1	6.1	7.4	5.1	5.9	4.8	3.5	3.9	5.3	6.7	6.0	7.3		17
Calm	0.8	0.3	0.3	0.1	0.5	0.1	0.1	0.3	0.3	0.4	1.0	0.4		17
VISIBILITY														
Days with Visibility equal to or less than 1/4 mile	3	3	4	3	4	4	2	1	1	3	2	3	33	17

NEWARK, NEW JERSEY (40°42'N., 74°10'W.) Elevation 7 ft. (2.1m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
STATION LEVEL PRESSURE														
Mean (Millibars)	1018.2	1016.4	1014.4	1013.0	1013.1	1014.8	1014.4	1016.3	1017.5	1019.2	1016.6	1017.5	1016.0	3 [1]
TEMPERATURE (DEGREES F)														
Mean	31.4	32.6	40.6	51.7	61.9	71.4	76.4	74.6	67.8	57.5	46.2	34.5	53.9	30
Mean Daily Maximum	38.5	40.2	48.8	61.2	71.6	81.1	85.6	83.7	77.0	66.9	54.2	41.5	62.5	30
Mean Daily Minimum	24.3	24.9	32.4	42.2	52.1	61.6	67.2	65.5	58.6	48.1	38.2	27.4	45.2	30
Extreme Highest	69	66	79	91	96	101	105	100	95	87	81	68	105	10
Extreme Lowest	1	4	8	26	35	46	59	50	41	28	20	8	1	10
RELATIVE HUMIDITY														
Average Percentage (0700 l.s.t.)	73	71	69	64	69	73	71	74	77	77	76	75	73	10
Average Percentage (1300 l.s.t.)	58	56	52	46	52	55	52	52	55	53	57	62	54	10
CLOUD COVER														
Average Amount (Tenths)	6.4	6.4	6.3	6.4	6.4	6.1	6.2	6.0	5.6	5.3	6.3	6.4	6.2	30
Mean Number of Days with Clear Skies	8	7	8	7	7	7	7	8	10	11	8	8	96	34
Mean Number of Days with Cloudy Skies	15	13	15	14	13	12	12	11	11	11	14	15	156	34
PRECIPITATION														
Mean Amount (Inches)	2.91	2.95	3.93	3.44	3.60	2.99	4.03	4.27	3.44	2.82	3.61	3.46	41.45	30
Greatest Amount (Inches)	5.12	4.47	6.29	6.41	6.28	6.40	8.02	11.84	9.00	6.70	8.42	7.24	52.65	22
Least Amount (Inches)	0.81	1.22	1.12	0.90	0.52	0.49	0.89	0.50	1.03	0.21	0.80	0.27	26.09	22
Maximum in 24 hrs. (Inches)	1.78	2.45	2.58	2.01	4.11	2.31	3.40	7.84	5.27	3.04	3.78	2.14	7.84	22
Mean Amount of Snow (Inches)	6.8	8.0	5.0	0.5	t	0.0	0.0	0.0	0.0	t	0.4	6.9	27.6	34
Maximum Snowfall in 24 hrs. (Inches)	13.7	20.0	17.6	4.1	t	0.0	0.0	0.0	0.0	0.3	3.1	26.0	26.0	34
Mean Number of Days with Snow (One Inch or More)	2	2	1	**	0	0	0	0	0	0	**	2	7	34
0.01 Inch or More, Mean Number of Days	11	10	12	11	12	10	10	9	8	7	10	11	123	34
WIND														
Mean Wind Speed (Knots)	9.6	9.7	10.3	9.4	8.6	8.0	7.6	7.3	7.5	8.2	8.3	7.8	8.5	10
Direction (Percentage of Obs.)														
North	5	4	5	4	4	3	3	4	4	4	3	3	4	10
North Northeast	9	7	8	7	6	6	6	9	10	8	8	8	8	10
Northeast	6	7	7	7	6	5	5	7	6	12	5	7	6	10
East Northeast	3	4	6	6	5	4	3	4	3	5	3	3	4	10
East	3	4	5	5	6	5	3	3	3	3	3	2	4	10
East Southeast	1	3	4	7	7	6	3	3	5	3	3	2	4	10
Southeast	1	1	2	4	3	4	3	3	3	2	2	1	2	10
South Southeast	1	3	3	5	5	7	7	6	6	3	3	2	4	10
South	3	3	3	4	4	5	6	6	5	3	4	2	4	10
South Southwest	6	6	4	8	9	11	12	12	11	9	10	9	9	10
Southwest	9	8	6	8	10	10	14	12	12	11	12	12	10	10
West Southwest	8	8	7	8	8	7	9	8	7	8	9	12	8	10
West	8	6	7	5	5	5	6	6	6	6	9	9	7	10
West Northwest	13	14	12	9	6	8	7	5	5	7	11	12	9	10
Northwest	12	12	11	7	7	6	6	5	6	7	7	9	8	10
North Northwest	10	9	10	6	7	5	5	5	5	7	7	7	7	10
Calm	1	1	1	1	1	2	2	2	2	1	1	1	1	10
Direction (Mean Speed, Knots)														
North	9.8	10.2	10.4	10.2	8.6	7.7	7.5	7.5	8.1	8.8	8.5	8.2	8.9	10
North Northeast	10.6	8.9	10.1	9.9	9.4	8.2	8.0	8.4	8.2	9.2	8.9	8.3	9.0	10
Northeast	8.7	8.9	9.4	9.6	8.7	7.9	7.6	7.7	7.4	8.4	7.3	7.9	8.3	10
East Northeast	7.8	8.9	9.8	9.5	8.5	8.2	7.1	7.7	7.2	9.5	7.1	6.9	8.4	10
East	5.2	6.1	8.4	6.8	6.3	6.7	6.3	6.5	5.9	7.9	6.0	5.1	6.6	10
East Southeast	5.2	6.7	9.3	8.2	7.8	7.6	7.5	7.6	7.8	8.8	6.9	7.0	7.7	10
Southeast	5.5	5.7	8.7	7.8	7.7	7.6	8.2	8.4	7.4	7.8	7.3	5.6	7.6	10
South Southeast	6.0	6.8	8.4	8.0	7.8	8.0	8.2	8.0	8.3	7.3	6.9	8.8	7.9	10
South	6.1	6.6	7.6	6.9	7.2	6.8	7.6	6.9	7.4	6.2	7.3	5.3	6.9	10
South Southwest	7.8	8.2	8.0	9.0	8.2	7.9	7.8	7.1	7.8	7.5	7.3	6.9	7.7	10
Southwest	6.7	6.6	7.6	7.4	7.4	6.7	6.6	6.0	6.2	6.0	6.5	5.5	6.5	10
West Southwest	7.8	8.5	9.6	10.1	9.2	7.8	7.2	6.9	6.4	7.0	7.8	6.9	7.9	10
West	9.8	10.2	11.5	10.1	8.8	8.2	7.4	6.9	6.9	7.3	9.2	8.1	8.8	10
West Northwest	12.1	12.5	12.2	11.7	10.3	9.7	9.5	8.1	8.9	9.3	10.8	9.6	10.8	10
Northwest	12.9	13.0	12.7	12.5	11.6	10.2	9.3	8.3	8.9	10.4	10.7	10.4	11.3	10
North Northwest	12.2	12.8	12.2	12.1	11.0	10.0	9.1	9.6	9.6	10.3	10.9	10.7	11.1	10
VISIBILITY														
Days with Visibility equal to or less than 1/4 mile	3	2	2	1	2	1	1	1	1	2	2	2	20	34

ATLANTIC CITY, NEW JERSEY (39°27'N., 74°34'W.) Elevation 64 ft. (19.5m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1018.6	1017.2	1015.7	1015.8	1015.8	1015.3	1016.0	1016.2	1018.5	1018.6	1017.6	1018.6	1017.0	28
TEMPERATURE (DEGREES F)														
Mean	32.7	33.9	41.4	51.7	61.6	70.3	75.1	73.4	67.1	56.7	46.0	35.1	53.7	30
Mean Daily Maximum	41.4	42.9	50.7	62.3	72.4	80.8	84.7	83.0	77.3	67.5	55.9	44.2	63.6	30
Mean Daily Minimum	24.0	24.9	31.5	41.0	50.7	59.7	65.4	63.8	56.8	45.9	36.1	26.0	43.8	30
Extreme Highest	78	70	81	94	99	106	104	97	93	87	81	72	106	11
Extreme Lowest	-8	-7	7	12	25	37	46	40	32	23	11	0	-8	11
RELATIVE HUMIDITY														
Average Percentage (0700 l.s.t.)	75	77	77	76	79	85	85	87	88	87	82	77	81	11
Average Percentage (1300 l.s.t.)	57	57	55	51	57	60	59	57	58	56	57	59	57	11
CLOUD COVER														
Average Amount (Tenths)	6.3	6.5	6.3	6.3	6.4	6.2	6.3	6.0	5.7	5.3	6.1	6.5	6.1	17
Mean Number of Days with Clear Skies	9	7	8	7	6	7	7	8	10	11	8	8	96	17
Mean Number of Days with Cloudy Skies	15	14	15	13	13	12	14	13	12	12	13	16	162	17
PRECIPITATION														
Mean Amount (Inches)	3.56	3.37	4.31	3.37	3.54	3.38	4.36	4.90	2.99	3.46	4.21	4.01	45.46	30
Greatest Amount (Inches)	8.14	6.86	7.57	7.59	8.80	6.36	13.09	11.96	11.76	7.93	9.65	7.86	67.17	40
Least Amount (Inches)	0.38	1.38	0.70	1.28	0.54	0.28	0.31	0.44	0.01	0.15	0.67	0.90	31.87	40
Maximum in 24 hrs. (Inches)	2.86	2.59	2.27	3.37	4.15	2.91	6.46	6.40	3.98	2.95	3.93	2.75	6.46	32
Mean Amount of Snow (Inches)	4.8	5.1	3.1	0.3	0.0	0.0	0.0	0.0	0.0	*	0.4	2.4	16.1	31
Maximum Snowfall in 24 hrs. (Inches)	14.4	13.1	11.5	3.2	0.0	0.0	0.0	0.0	0.0	*	7.8	7.5	14.4	31
Mean Number of Days with Snow (One Inch or More)	1	2	1	**	0	0	0	0	0	0	**	1	4	31
0.01 Inch or More, Mean Number of Days	11	10	11	11	10	9	9	9	8	7	9	9	113	32
WIND														
Mean Wind Speed (Knots) (0700 l.s.t.)	9.2	9.2	9.8	9.2	8.4	7.5	6.7	6.5	7.2	7.8	8.5	8.7		28
Mean Wind Speed (Knots) (1300 l.s.t.)	12.7	13.2	13.7	13.2	12.0	10.6	9.8	9.3	10.1	10.9	12.1	12.3		28
Direction (Percentage of Obs.): at 0700 l.s.t.														
North	8.2	7.4	7.6	8.5	7.5	7.7	10.2	13.2	15.7	14.7	7.9	8.1		28
North Northeast	5.5	4.9	5.6	5.0	6.1	3.9	4.8	8.5	9.6	9.5	4.9	4.1		28
Northeast	3.1	4.0	4.8	4.4	5.9	5.8	4.4	5.3	6.7	5.5	2.9	3.6		28
East Northeast	2.3	3.9	7.0	6.2	6.5	6.4	4.1	3.3	5.1	4.3	2.9	2.8		28
East	2.0	2.7	3.7	4.6	5.1	3.1	2.7	2.7	2.9	2.0	1.9	1.7		28
East Southeast	2.0	2.8	3.0	3.5	3.1	3.4	1.5	2.6	2.5	1.7	2.7	1.6		28
Southeast	1.2	1.8	2.3	2.2	2.9	1.6	2.1	2.4	2.1	1.6	1.9	0.9		28
South Southeast	2.1	2.3	2.0	3.9	3.9	4.2	4.1	3.2	2.3	2.1	2.	2.5		28
South	5.1	4.0	5.4	6.9	6.4	6.9	7.8	6.0	5.4	3.8	5.6	3.7		28
South Southwest	7.4	5.1	5.8	6.7	6.8	7.6	8.4	6.9	7.0	5.8	7.3	6.0		28
Southwest	5.0	4.9	4.0	5.4	5.5	7.8	8.8	7.0	6.6	5.9	5.4	5.4		28
West Southwest	7.9	9.0	7.8	7.0	9.2	10.5	11.6	8.0	6.3	7.4	7.6	10.3		28
West	11.6	9.3	9.1	7.4	7.3	7.8	8.6	7.8	5.6	7.7	11.3	14.1		28
West Northwest	12.8	13.9	11.3	9.8	7.2	6.2	5.0	5.3	4.9	7.9	13.2	14.2		28
Northwest	9.1	9.9	9.1	6.5	6.1	6.8	5.4	5.4	4.8	7.2	9.5	9.2		28
North Northwest	10.0	10.3	8.6	8.4	7.3	7.5	6.6	8.0	8.3	8.8	8.8	8.2		28
Calm	4.4	4.1	3.0	3.4	3.0	2.9	3.7	4.4	4.1	4.1	3.3	3.5		28
Direction (Percentage of Obs.): at 1300 l.s.t.														
North	7.0	4.7	4.9	4.0	3.2	2.1	2.5	2.8	15.7	6.7	4.8	6.0		28
North Northeast	3.0	4.1	2.8	1.5	1.4	1.5	1.3	2.7	9.6	3.8	2.7	2.8		28
Northeast	3.2	2.8	2.5	2.2	2.8	2.1	2.0	4.1	6.7	5.1	2.2	2.6		28
East Northeast	2.8	4.4	5.1	5.8	5.8	5.2	4.7	5.2	5.1	7.9	4.2	3.9		28
East	1.9	2.9	4.2	5.6	4.8	5.7	5.7	5.9	2.9	5.2	3.2	3.0		28
East Southeast	1.8	4.2	5.1	6.5	8.4	8.7	6.5	7.9	2.5	5.5	3.6	2.3		28
Southeast	2.1	2.7	4.5	5.0	7.1	5.4	5.8	5.3	2.1	3.5	4.0	1.3		28
South Southeast	2.6	4.1	5.5	10.1	11.7	13.1	11.3	9.7	2.3	6.6	5.7	3.1		28
South	5.8	5.9	9.5	12.2	12.4	15.1	16.3	12.8	5.4	7.9	7.4	4.3		28
South Southwest	4.9	6.0	4.2	4.6	4.8	5.8	7.5	6.8	7.0	5.4	5.9	7.0		28
Southwest	5.1	3.0	2.9	2.2	3.5	4.4	6.7	5.1	6.6	3.8	5.0	4.9		28
West Southwest	7.3	5.4	5.5	5.7	7.2	6.6	7.8	7.1	6.3	7.1	6.2	7.9		28
West	8.9	9.3	8.8	8.6	6.9	7.6	7.0	7.2	5.8	7.6	10.0	9.2		28
West Northwest	16.7	17.1	13.4	11.2	8.5	7.5	6.2	7.5	4.9	8.6	13.9	15.9		28
Northwest	11.9	12.2	10.5	7.3	5.3	5.1	4.8	5.0	4.8	6.6	12.0	14.7		28
North Northwest	13.2	10.2	10.6	7.0	6.1	3.9	3.5	4.3	8.3	8.2	8.8	9.8		28
Calm	1.8	1.1	0.0	0.6	0.2	0.3	0.4	0.6	4.1	0.6	0.5	1.4		28
VISIBILITY														
Days with Visibility equal to or less than 1/4 mile	4	4	4	3	4	5	4	4	4	5	3	4	48	17

WILMINGTON, DELAWARE (39°40'N., 75°36'W.) Elevation 74 ft. (22.6m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
STATION LEVEL PRESSURE														
Mean (Millibars)	1017.0	1014.9	1012.8	1011.9	1011.3	1012.7	1012.8	1014.7	1015.7	1017.6	1015.5	1015.8	1014.4	3
TEMPERATURE (DEGREES F)														
Mean	32.0	33.6	41.6	52.3	62.4	71.4	75.8	74.1	67.9	57.2	45.7	34.7	54.0	30
Mean Daily Maximum	40.2	42.2	51.1	63.0	73.1	81.6	85.5	83.9	78.2	67.8	55.2	43.0	63.7	30
Mean Daily Minimum	23.8	24.9	32.0	41.5	51.6	61.1	66.1	64.3	57.6	46.5	36.2	26.3	44.3	30
Extreme Highest	75	74	86	91	95	99	102	101	100	91	85	72	102	28
Extreme Lowest	-4	-4	9	22	32	41	50	46	36	24	14	3	-4	28
RELATIVE HUMIDITY														
Average Percentage (0700 l.s.t.)	75	75	74	73	76	79	80	84	85	84	80	77	79	28
Average Percentage (1300 l.s.t.)	61	58	53	50	53	54	54	56	55	53	56	60	55	28
CLOUD COVER														
Average Amount (Tenths)	6.6	6.5	6.5	6.5	6.6	6.0	6.1	5.8	5.7	5.3	6.2	6.5	6.2	28
Mean Number of Days with Clear Skies	7	7	7	7	6	7	7	9	10	12	8	7	94	28
Mean Number of Days with Cloudy Skies	17	14	15	15	14	12	12	12	12	12	13	16	164	28
PRECIPITATION														
Mean Amount (Inches)	2.85	2.75	3.74	3.20	3.35	3.24	4.31	3.98	3.42	2.60	3.49	3.32	40.25	30
Greatest Amount (Inches)	7.45	6.29	6.02	6.57	7.35	8.37	9.94	12.09	9.53	6.41	8.11	7.90	61.05	40
Least Amount (Inches)	0.59	1.52	0.81	1.12	0.22	0.44	0.16	0.25	0.45	0.21	0.67	0.19	24.90	40
Maximum in 24 hrs. (Inches)	1.61	2.29	2.75	2.56	2.35	4.35	6.24	4.11	5.62	3.88	3.83	2.22	6.24	28
Mean Amount of Snow (Inches)	5.4	5.8	3.7	0.1	t	0.0	0.0	0.0	0.0	t	1.0	4.1	20.1	28
Maximum Snowfall in 24 hrs. (Inches)	11.2	9.9	15.6	1.1	t	0.0	0.0	0.0	0.0	0.3	11.9	12.4	15.6	28
Mean Number of Days with Snow (One Inch or More)	2	2	1	**	0	0	0	0	0	0	**	1	6	28
0.01 Inch or More, Mean Number of Days	11	10	11	11	12	9	9	9	8	7	9	10	116	28
WIND														
Mean Wind Speed (Knots)	8.4	8.9	9.6	8.9	7.6	7.1	6.5	6.3	6.6	7.0	7.4	7.6	7.6	10
Direction (Percentage of Obs.)														
North	5.1	4.9	5.4	4.4	5.2	5.0	5.7	6.9	7.9	8.1	5.5	4.7	5.7	10
North Northeast	4.5	3.6	4.0	5.0	4.4	3.2	3.5	5.2	4.3	5.5	3.0	3.5	4.2	10
Northeast	3.7	3.5	5.0	3.9	4.0	3.5	2.8	4.3	4.0	5.3	2.7	3.6	3.9	10
East Northeast	3.8	5.2	6.4	7.0	5.0	3.6	2.9	4.5	4.2	6.3	3.0	5.0	4.7	10
East	2.3	3.5	4.7	4.7	4.2	4.2	2.5	3.7	3.4	2.8	2.7	3.0	3.5	10
East Southeast	1.7	2.1	3.2	3.3	3.5	3.0	2.3	3.2	3.1	2.3	3.1	1.7	2.7	10
Southeast	1.9	2.1	2.2	3.0	3.0	3.2	2.8	3.7	3.4	2.6	1.9	1.7	2.6	10
South Southeast	3.1	4.2	4.5	6.4	4.9	5.2	5.0	4.6	5.8	3.5	3.6	2.5	4.4	10
South	6.5	7.2	5.6	9.7	10.1	11.3	10.8	9.6	9.9	6.8	7.4	4.7	8.3	10
South Southwest	4.1	3.5	2.8	5.2	5.3	4.7	7.3	5.8	6.1	4.7	4.2	4.8	4.9	10
Southwest	4.5	4.5	3.2	5.5	7.1	6.1	8.9	6.7	6.4	5.2	5.3	5.7	5.8	10
West Southwest	5.4	5.5	5.3	6.1	7.9	8.5	8.8	6.6	6.0	6.7	7.4	9.7	7.0	10
West	6.5	7.0	5.8	6.2	6.6	6.8	6.7	6.3	4.7	5.4	8.2	8.8	6.6	10
West Northwest	16.3	15.1	15.0	10.8	7.7	9.4	7.4	7.2	6.0	9.1	13.2	14.6	11.0	10
Northwest	14.6	13.9	15.7	8.6	9.2	10.0	8.7	7.7	8.4	10.7	13.4	12.9	11.2	10
North Northwest	9.4	7.7	8.3	6.7	5.5	5.9	6.0	7.0	7.9	7.8	7.2	5.9	7.1	10
Calm	6.7	6.4	3.0	3.5	6.3	6.4	7.7	6.9	8.4	7.2	8.0	7.2	6.5	10
Direction (Mean Speed, Knots)														
North	8.0	7.4	7.9	8.0	6.8	6.3	6.1	6.1	6.4	6.4	6.3	7.6	6.9	10
North Northeast	9.1	8.2	8.9	8.3	8.3	7.4	6.5	7.8	7.5	8.2	8.3	8.2	8.1	10
Northeast	9.0	8.8	9.3	8.4	7.7	7.2	6.5	7.4	7.6	8.9	7.6	9.3	8.2	10
East Northeast	9.4	9.6	9.8	9.9	8.2	8.3	7.3	7.8	8.0	11.5	8.0	9.0	9.1	10
East	6.0	7.3	8.3	8.4	7.6	7.6	6.8	6.7	7.9	7.6	6.9	6.9	7.5	10
East Southeast	5.7	6.5	8.1	8.0	7.4	7.4	6.9	6.9	6.7	7.3	6.9	6.2	7.1	10
Southeast	5.2	6.3	7.6	7.0	6.4	6.5	6.3	6.7	6.4	6.9	6.0	5.7	6.5	10
South Southeast	7.5	8.2	10.4	9.3	8.7	8.7	8.8	8.4	9.1	7.8	8.4	8.3	8.8	10
South	7.4	8.2	9.5	9.4	8.9	8.8	8.4	8.0	8.1	7.4	7.9	7.4	8.3	10
South Southwest	7.9	7.8	8.9	9.5	7.6	7.6	7.0	6.8	7.5	7.4	8.2	7.2	7.6	10
Southwest	7.8	8.0	8.9	9.1	8.1	7.2	7.2	6.4	7.3	7.0	6.9	7.0	7.5	10
West Southwest	7.3	8.0	8.8	8.7	8.0	7.7	7.0	6.7	7.0	6.8	7.6	7.7	7.6	10
West	7.3	9.0	8.4	8.6	7.3	6.4	6.1	5.7	5.6	6.1	7.6	7.2	7.1	10
West Northwest	10.8	12.3	11.7	10.2	8.0	7.5	6.9	6.3	6.4	7.4	9.3	9.2	9.4	10
Northwest	10.3	11.2	11.6	10.6	8.5	7.6	6.5	6.0	6.4	7.3	9.2	9.6	9.1	10
North Northwest	11.1	10.5	10.6	10.0	8.7	7.5	6.7	6.3	6.8	7.3	8.2	8.9	8.9	10
VISIBILITY														
Days with Visibility equal to or less than 1/4 mile	5	4	3	3	3	2	3	3	4	4	4	4	39	28

PHILADELPHIA, PENNSYLVANIA (39°53'N., 75°15'W.) Elevation 5 ft. (1.5m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
STATION LEVEL PRESSURE														
Mean (Millibars)	1018.9	1016.9	1014.7	1013.7	1013.1	1014.9	1014.8	1016.6	1017.6	1019.6	1017.3	1017.8	1016.3	3
TEMPERATURE (DEGREES F)														
Mean	32.3	33.9	41.9	52.9	63.2	72.3	76.8	74.8	68.1	57.4	46.2	35.2	54.6	30
Mean Daily Maximum	40.1	42.2	51.2	63.5	74.1	83.0	86.8	84.8	78.4	67.9	55.5	43.2	64.2	30
Mean Daily Minimum	24.4	25.5	32.5	42.3	52.3	61.6	66.7	64.7	57.8	46.9	36.9	27.2	44.9	30
Extreme Highest	69	69	80	92	96	100	104	99	97	88	81	71	104	16
Extreme Lowest	-5	-4	9	24	28	44	51	45	35	25	17	3	-5	16
RELATIVE HUMIDITY														
Average Percentage (0700 l.s.t.)	74	71	71	69	75	78	79	81	83	82	77	74	76	16
Average Percentage (1300 l.s.t.)	60	57	53	49	53	55	54	54	56	53	55	61	55	16
CLOUD COVER														
Average Amount (Tenths)	6.7	6.4	6.4	6.5	6.5	6.2	6.1	5.9	5.7	5.5	6.3	6.5	6.2	35
Mean Number of Days with Clear Skies	7	7	7	7	6	7	7	8	10	11	7	7	91	35
Mean Number of Days with Cloudy Skies	16	14	15	14	14	12	12	12	11	12	13	15	160	35
PRECIPITATION														
Mean Amount (Inches)	2.81	2.62	3.69	3.29	3.35	3.70	4.09	4.11	3.03	2.53	3.39	3.32	39.93	30
Greatest Amount (Inches)	6.06	5.43	6.27	6.68	7.41	7.88	8.33	9.70	8.78	5.21	9.06	7.23	52.13	33
Least Amount (Inches)	0.45	1.37	0.68	1.13	0.47	0.11	0.64	0.49	0.44	0.09	0.64	0.25	29.34	33
Maximum in 24 hrs. (Inches)	2.27	1.96	2.39	2.76	2.09	4.62	4.26	5.68	5.45	3.78	3.46	1.77	5.68	29
Mean Amount of Snow (Inches)	5.3	6.2	3.7	0.2	t	0.0	0.0	0.0	0.0	t	0.7	4.2	20.3	33
Maximum Snowfall in 24 hrs. (Inches)	13.2	13.0	10.0	4.3	t	0.0	0.0	0.0	0.0	t	8.7	14.6	14.6	33
Mean Number of Days with Snow (One Inch or More)	2	2	1	**	0	0	0	0	0	**	**	1	6	35
0.01 Inch or More, Mean Number of Days	11	9	11	11	11	10	9	9	8	7	9	10	116	35
WIND														
Mean Wind Speed (Knots)	8.9	9.6	10.0	9.6	8.4	7.6	7.0	6.9	7.2	7.7	8.4	8.8	8.3	35
Direction (Percentage of Obs.), at 0700 l.s.t.														
North	8.3	9.6	7.0	8.4	7.4	7.7	8.3	7.7	9.2	9.1	10.0	8.9	8.4	15
North Northeast	7.3	6.6	8.4	6.8	5.9	4.0	7.8	9.2	7.2	6.9	4.8	6.6	6.8	15
Northeast	4.0	4.8	6.6	9.4	6.3	7.2	6.9	10.4	10.0	9.8	6.1	6.9	7.4	15
East Northeast	6.3	9.1	7.7	4.7	8.1	7.0	4.0	5.1	7.2	8.9	4.8	4.1	6.4	15
East	6.8	4.8	4.5	7.7	6.5	6.5	6.2	6.5	9.0	8.6	5.3	5.6	6.5	15
East Southeast	1.8	1.5	3.6	3.8	5.2	3.3	4.3	4.1	4.0	2.2	3.4	1.5	3.2	15
Southeast	2.0	2.3	3.4	3.3	3.8	3.0	2.4	2.2	4.2	1.9	2.6	2.8	2.8	15
South Southeast	0.3	0.3	1.4	0.5	1.8	1.6	0.7	1.9	1.0	1.9	2.6	0.3	1.2	15
South	2.8	3.5	3.2	4.2	2.5	3.0	5.0	4.1	3.2	1.7	4.5	3.3	3.4	15
South Southwest	2.5	3.5	2.7	4.7	4.5	5.1	4.3	3.9	2.7	2.6	3.7	3.6	3.7	15
Southwest	6.5	3.8	5.7	6.8	8.3	7.7	6.4	4.8	7.2	5.7	6.3	5.1	6.2	15
West Southwest	6.8	4.3	3.6	5.6	5.4	8.8	8.5	5.8	4.7	3.8	5.0	5.3	5.7	15
West	10.1	11.4	8.6	9.1	7.7	9.8	9.9	8.2	7.0	9.6	8.2	10.4	9.1	15
West Northwest	10.6	9.1	7.7	6.1	5.6	5.8	4.7	3.6	3.5	4.6	9.2	13.7	7.0	15
Northwest	6.8	10.1	7.9	7.7	8.1	4.2	3.8	4.8	4.7	7.2	9.5	9.4	7.0	15
North Northwest	8.8	9.1	11.6	4.9	5.0	6.3	5.2	4.8	3.5	2.4	6.1	8.4	6.3	15
Calm	8.5	6.3	6.4	6.3	7.9	9.1	11.8	13.0	11.5	13.2	7.9	4.3	8.9	15
Direction (Percentage of Obs.), at 1300 l.s.t.														
North	8.9	9.6	9.4	7.5	4.5	4.6	5.0	5.3	4.3	5.8	10.0	9.7	7.0	15
North Northeast	4.3	3.4	3.9	3.6	3.9	3.5	3.3	4.1	3.3	6.9	2.0	4.3	3.9	15
Northeast	4.6	3.6	5.0	5.2	4.3	2.8	1.7	5.8	4.5	6.2	4.0	3.4	4.3	15
East Northeast	3.6	4.8	5.0	4.3	5.7	3.0	2.6	4.1	4.3	4.2	2.0	4.1	4.0	15
East	5.3	5.1	4.6	4.8	4.5	5.3	2.8	5.5	8.5	6.9	5.8	5.1	5.3	15
East Southeast	2.4	2.6	2.8	3.6	4.5	4.6	2.8	2.9	5.3	3.9	3.0	1.4	3.3	15
Southeast	1.9	1.9	3.5	4.1	3.4	3.7	6.1	4.1	4.3	5.8	2.5	2.2	3.6	15
South Southeast	0.5	1.0	3.1	2.1	3.0	4.2	3.1	5.3	3.3	2.1	3.0	1.0	2.6	15
South	1.7	3.4	3.5	4.1	4.5	3.7	4.3	4.1	4.8	2.8	4.3	3.1	3.7	15
South Southwest	2.6	3.9	2.6	2.7	3.6	5.6	6.8	7.0	7.5	3.0	3.5	2.4	4.2	15
Southwest	7.7	7.0	7.8	8.9	9.3	9.3	13.0	9.6	8.8	7.6	8.5	4.6	8.5	15
West Southwest	5.3	7.2	5.9	8.0	8.2	11.6	8.7	7.4	6.3	7.6	6.3	9.4	7.7	15
West	12.9	9.6	11.3	13.4	16.8	15.5	18.4	13.7	13.0	15.0	12.5	12.5	13.7	15
West Northwest	11.2	11.8	8.1	8.9	7.3	8.8	6.6	6.0	6.8	9.0	8.8	10.1	8.6	15
Northwest	9.6	12.0	10.0	7.7	7.9	6.9	5.2	7.4	5.8	5.5	11.3	13.0	8.5	15
North Northwest	11.0	9.1	10.0	7.3	5.4	4.2	5.7	3.8	8.0	5.3	8.3	10.3	7.4	15
Calm	6.7	4.1	3.5	3.6	3.2	2.8	4.0	4.1	1.5	2.5	4.3	3.6	3.7	15
VISIBILITY														
Days with Visibility equal to or less than 1/4 mile	3	3	2	1	1	1	1	1	2	4	3	3	25	35

TRENTON, NEW JERSY (40°13'N., 74°46'W.) Elevation 56 ft. (17.1m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1018.6	1017.1	1015.9	1015.6	1016.1	1015.2	1015.9	1016.0	1018.4	1018.4	1017.5	1018.5	1017.0	26
TEMPERATURE (DEGREES F)														
Mean	32.1	33.4	41.2	52.2	62.1	71.3	75.9	73.9	67.2	57.2	46.3	34.9	54.0	30
Mean Daily Maximum	38.8	40.6	49.2	61.8	72.0	80.9	84.9	82.8	76.2	66.2	53.9	41.5	62.4	30
Mean Daily Minimum	25.3	26.1	33.1	42.5	52.2	61.6	66.8	65.0	58.1	48.2	38.7	28.3	45.5	30
Extreme Highest	72	73	86	91	96	100	106	100	100	94	83	72	106	43
Extreme Lowest	-3	-14	8	24	34	43	53	48	36	27	14	-2	-14	43
RELATIVE HUMIDITY														
Average Percentage (0700 l.s.t.)	75	74	75	75	76	78	80	82	84	83	80	77		25
Average Percentage (1300 l.s.t.)	62	60	57	53	53	54	55	57	56	56	58	62		25
CLOUD COVER														
Average Amount (Tenths)	6.2	6.1	6.1	6.2	6.3	6.0	5.9	5.7	5.6	5.1	6.2	6.3	6.0	32
Mean Number of Days with Clear Skies	8	8	8	7	7	7	8	8	10	12	8	8	99	43
Mean Number of Days with Cloudy Skies	14	12	14	13	13	12	11	11	11	11	13	14	149	43
PRECIPITATION														
Mean Amount (Inches)	2.76	2.70	3.81	3.15	3.40	3.21	4.74	4.17	3.17	2.53	3.25	3.28	40.17	30
Greatest Amount (Inches)	6.00	5.56	7.53	6.61	8.03	9.00	13.39	14.10	10.49	6.77	7.74	6.97	59.41	40
Least Amount (Inches)	0.52	1.15	1.17	0.83	0.25	0.06	0.37	0.47	0.19	0.05	0.75	0.19	28.79	40
Maximum in 24 hrs. (Inches)	2.03	2.53	2.55	2.46	3.11	4.79	6.11	7.55	4.01	3.46	2.90	2.67	7.55	43
Mean Amount of Snow (Inches)	5.5	7.1	4.3	0.5	t	0.0	0.0	0.0	0.0	0.1	0.9	4.6	23.0	43
Maximum Snowfall in 24 hrs. (Inches)	10.1	13.0	14.3	4.4	t	0.0	0.0	0.0	0.0	2.5	7.7	16.6	16.6	43
Mean Number of Days with Snow (One Inch or More)	2	2	1	**	0	0	0	0	0	**	**	1	7	43
0.01 Inch or More, Mean Number of Days	11	10	12	11	12	10	10	10	8	7	10	11	122	43
WIND														
Mean Wind Speed (Knots) (0700 l.s.t.)	6.9	7.2	7.5	7.2	6.0	5.5	4.5	4.4	4.9	5.2	5.6	6.3		25-26
Mean Wind Speed (Knots) (1300 l.s.t.)	9.8	10.4	10.6	10.3	8.9	7.8	7.0	7.0	7.7	8.4	9.3	9.6		25-26
Direction (Percentage of Obs.): at 0700 l.s.t.														
North	6.7	6.1	6.9	6.1	7.2	7.0	6.1	8.3	11.2	9.6	4.9	5.6		25-26
North Northeast	4.6	4.7	5.9	4.1	5.4	4.5	5.3	5.9	6.5	6.4	3.2	3.4		25-26
Northeast	3.8	4.4	4.7	4.2	5.1	3.4	5.0	4.4	6.5	5.7	3.4	4.2		25-26
East Northeast	2.4	3.0	5.8	6.9	6.0	4.5	3.3	4.0	3.8	1.8	2.1	2.6		25-26
East	2.3	3.4	4.7	5.5	5.0	4.0	3.0	2.3	2.6	2.4	2.0	1.5		25-26
East Southeast	1.1	1.5	2.1	2.6	2.4	2.2	1.7	1.6	1.5	1.8	2.3	1.4		25-26
Southeast	1.0	1.2	1.6	1.7	1.8	2.1	2.0	1.7	1.9	1.1	2.0	1.1		25-26
South Southeast	1.2	1.7	1.9	2.7	2.1	2.1	2.6	1.9	2.6	1.2	1.6	1.9		25-26
South	5.5	3.7	4.3	5.1	5.2	6.1	6.4	6.0	5.2	4.0	6.5	4.1		25-26
South Southwest	5.9	4.5	4.0	5.7	6.6	8.1	7.2	6.6	5.6	5.1	5.1	4.8		25-26
Southwest	6.2	6.4	5.7	6.4	8.6	11.0	10.6	7.4	6.4	6.1	6.4	7.4		25-26
West Southwest	5.9	4.5	5.4	6.9	6.3	8.0	7.0	6.4	4.4	6.6	6.2	8.4		25-26
West	12.1	12.5	9.0	7.7	6.2	5.8	5.8	6.5	4.9	6.5	11.1	15.1		25-26
West Northwest	13.1	11.9	10.3	8.4	6.8	5.7	5.0	4.1	4.6	6.1	9.8	9.7		25-26
Northwest	8.3	8.1	8.1	7.0	5.3	5.3	5.0	4.4	5.0	6.4	5.8	6.6		25-26
North Northwest	6.2	7.0	7.7	6.2	5.0	5.3	4.6	6.4	6.3	6.5	5.3	5.8		25-26
Calm	13.7	15.3	11.8	13.0	14.9	15.2	19.4	22.2	21.0	22.7	22.2	16.4		25-26
Direction (Percentage of Obs.): at 1300 l.s.t.														
North	6.0	5.7	6.3	5.0	4.5	5.2	3.7	5.0	6.5	6.1	4.3	6.1		25-26
North Northeast	3.4	4.4	3.6	2.9	2.7	2.7	2.7	5.0	4.4	3.6	3.4	3.2		25-26
Northeast	2.8	3.5	2.6	2.9	2.5	2.7	3.2	4.0	5.2	4.6	3.1	3.3		25-26
East Northeast	2.9	2.8	4.5	3.8	5.3	2.9	3.8	4.4	5.7	4.6	2.0	2.3		25-26
East	2.4	3.1	5.8	5.0	6.4	5.3	4.2	4.6	5.9	5.5	3.7	2.5		25-26
East Southeast	2.0	3.0	2.6	4.5	4.6	3.9	3.9	2.9	3.5	2.9	2.7	1.6		25-26
Southeast	1.3	2.1	2.3	2.1	2.2	2.9	3.6	2.5	2.4	1.9	3.0	1.4		25-26
South Southeast	1.1	2.2	2.7	3.1	2.6	3.5	4.7	3.1	3.5	2.6	2.6	1.7		25-26
South	3.1	2.7	3.8	4.2	3.9	5.6	6.1	6.1	4.8	4.1	4.9	3.9		25-26
South Southwest	5.8	4.2	4.1	4.8	5.6	7.4	6.5	6.7	6.5	5.7	5.5	5.3		25-26
Southwest	7.3	6.1	4.7	6.9	8.9	11.7	12.5	10.3	8.4	7.6	7.6	7.0		25-26
West Southwest	7.7	7.3	8.1	8.3	11.8	10.3	9.5	9.4	7.2	8.8	8.4	8.4		25-26
West	12.8	14.1	11.9	12.9	11.1	10.4	10.9	10.4	8.9	11.2	13.9	13.8		25-26
West Northwest	17.2	17.7	16.3	13.2	10.6	9.5	8.2	9.2	7.7	9.8	13.1	17.5		25-26
Northwest	11.2	10.7	9.8	9.3	6.9	6.8	6.5	6.8	7.2	9.0	10.9	10.3		25-26
North Northwest	8.2	6.1	8.3	6.7	5.7	4.8	4.7	5.4	7.0	7.1	6.2	6.7		25-26
Calm	4.7	4.0	2.7	4.2	4.7	4.5	5.2	4.2	5.2	5.0	4.9	4.9		25-26

NORFOLK, VIRGINIA (36°54'N., 76°12'W.) Elevation 24 ft. (7.3m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1019.8	1018.0	1016.7	1016.7	1016.3	1015.8	1016.4	1016.3	1018.2	1018.6	1018.4	1019.6	1017.6	26
TEMPERATURE (DEGREES F)														
Mean	40.5	41.4	48.1	57.8	66.7	74.5	78.2	76.9	71.8	61.7	51.6	42.3	59.3	30
Mean Daily Maximum	48.8	50.0	57.3	67.7	76.2	83.5	86.6	84.9	79.6	70.1	60.5	50.6	68.0	30
Mean Daily Minimum	32.2	32.7	38.9	47.9	57.2	65.5	69.9	68.9	63.9	53.3	42.6	34.0	50.6	30
Extreme Highest	78	79	88	97	97	101	103	99	98	95	86	79	103	27
Extreme Lowest	-3	8	20	28	36	45	56	52	45	29	20	14	-3	27
RELATIVE HUMIDITY														
Average Percentage (0700 l.s.t.)	76	75	73	74	78	80	82	85	84	83	78	76	79	27
Average Percentage (1300 l.s.t.)	60	57	54	51	56	58	60	62	62	61	55	59	58	27
CLOUD COVER														
Average Amount (Tenths)	6.3	6.2	6.1	5.9	6.1	5.8	6.0	5.8	5.7	5.3	5.3	6.0	5.9	27
Mean Number of Days with Clear Skies	9	8	9	9	8	8	8	8	9	12	11	10	109	27
Mean Number of Days with Cloudy Skies	16	14	15	12	13	11	12	11	12	12	11	14	153	27
PRECIPITATION														
Mean Amount (Inches)	3.35	3.31	3.42	2.71	3.34	3.62	5.70	5.92	4.20	3.06	2.94	3.11	44.68	30
Greatest Amount (Inches)	6.40	5.72	6.41	5.80	7.77	9.72	13.73	11.19	12.26	10.12	7.01	5.83	57.78	27
Least Amount (Inches)	1.60	0.86	1.34	1.29	1.48	0.37	1.69	0.74	0.36	0.93	0.49	1.08	26.67	27
Maximum in 24 hrs. (Inches)	3.80	1.87	3.18	2.70	2.94	6.85	5.64	11.40	6.79	4.38	3.35	2.12	11.40	27
Mean Amount of Snow (Inches)	3.1	1.9	1.0	t	0.0	0.0	0.0	0.0	0.0	0.0	t	1.2	7.2	27
Maximum Snowfall in 24 hrs. (Inches)	9.1	6.3	7.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.6	11.4	11.4	27
Mean Number Days with Snow (One Inch or More)	1	1	**	*	0	0	0	0	0	0	0	**	2	27
0.01 Inch or More, Mean Number of Days	10	10	11	10	10	9	11	11	8	8	8	9	116	27
WIND														
Mean Wind Speed (Knots) (0700 l.s.t.)	8.8	9.1	9.6	9.4	8.6	7.5	7.0	6.8	7.6	7.9	7.8	8.0		34
Mean Wind Speed (Knots) (1300 l.s.t.)	11.0	11.7	12.2	11.8	10.4	9.2	8.8	8.9	9.8	10.1	10.6	10.5		34
Direction (Percentage of Obs.): at 0700 l.s.t.														
North	11.7	13.1	11.7	9.0	7.8	6.7	5.5	7.1	8.5	11.7	9.9	10.0		34
North Northeast	6.8	7.9	6.5	5.9	6.6	4.5	3.5	5.6	10.2	8.9	5.5	6.4		34
Northeast	3.2	3.6	4.0	3.8	5.3	4.3	3.6	5.6	8.0	7.1	3.8	3.5		34
East Northeast	1.8	2.0	3.8	3.6	3.6	3.7	3.4	3.7	4.3	2.6	1.3	1.6		34
East	1.2	2.1	2.6	3.6	3.2	2.7	2.5	2.6	3.3	3.1	1.4	1.2		34
East Southeast	0.9	1.3	2.1	3.0	2.0	2.2	2.1	1.9	1.7	1.7	1.4	0.7		34
Southeast	1.3	1.8	2.2	2.2	2.0	2.5	1.4	1.6	1.2	1.1	1.8	1.2		34
South Southeast	2.0	2.5	2.6	3.2	2.7	2.4	2.1	1.8	2.1	1.4	2.1	1.8		34
South	4.7	6.0	6.2	6.8	7.1	4.2	5.5	4.8	4.0	4.9	5.2	6.2		34
South Southwest	10.9	8.1	10.6	10.9	11.0	12.1	13.6	10.3	7.4	6.9	9.6	9.1		34
Southwest	8.7	7.1	8.5	11.6	10.8	15.3	15.5	13.2	9.7	9.1	9.3	8.8		34
West Southwest	8.8	7.9	6.9	7.8	10.8	10.8	12.9	8.6	5.2	4.6	7.3	9.1		34
West	5.7	7.1	5.4	4.2	5.3	5.3	5.0	4.2	3.5	4.4	6.4	5.8		34
West Northwest	4.2	4.4	4.1	3.2	2.9	2.6	2.4	2.7	3.3	3.4	4.9	5.0		34
Northwest	5.7	5.7	5.2	4.2	3.4	3.9	3.4	4.1	4.9	5.4	6.7	6.7		34
North Northwest	10.6	8.2	8.9	7.9	5.6	5.3	4.1	5.6	7.6	7.3	8.5	9.5		34
Calm	11.7	11.1	8.8	8.9	9.8	11.5	13.5	16.6	15.1	16.5	14.9	13.3		34
Direction (Percentage of Obs.): at 1300 l.s.t.														
North	13.0	13.0	8.6	7.2	4.5	4.6	4.9	7.3	11.5	12.6	10.3	14.6		34
North Northeast	9.3	10.0	8.9	9.1	8.5	7.7	6.8	9.9	12.5	12.9	9.5	9.3		34
Northeast	5.4	7.0	8.4	8.5	9.3	8.4	8.2	9.3	11.6	10.9	6.0	6.1		34
East Northeast	3.0	4.3	6.2	8.2	9.0	9.0	8.8	8.5	8.8	5.9	4.2	3.1		34
East	2.0	3.2	5.4	7.5	8.1	9.1	8.8	8.3	7.5	6.4	3.9	2.5		34
East Southeast	1.8	2.7	5.0	6.8	8.8	8.4	8.4	7.5	7.1	4.2	3.0	1.8		34
Southeast	1.7	2.1	2.2	2.7	3.9	3.2	3.6	4.3	2.6	2.7	2.5	1.4		34
South Southeast	1.0	2.4	2.3	3.7	3.4	2.8	4.1	3.1	2.2	2.0	2.3	2.1		34
South	4.5	4.6	3.8	5.5	5.6	5.9	6.5	6.1	5.3	4.5	6.4	4.6		34
South Southwest	8.4	6.7	7.6	8.0	7.0	8.1	9.0	8.2	6.4	6.7	8.3	8.5		34
Southwest	9.9	8.2	9.5	7.8	8.7	10.4	10.8	8.8	6.9	7.2	9.4	9.2		34
West Southwest	10.6	8.5	10.4	9.7	9.3	9.1	10.1	7.2	6.4	6.4	8.4	10.2		34
West	6.6	8.9	6.1	4.9	5.3	4.4	4.0	3.8	2.8	4.1	6.4	7.0		34
West Northwest	4.7	5.3	4.4	3.4	2.4	1.9	1.2	1.8	1.7	2.6	4.7	4.3		34
Northwest	5.2	4.0	4.5	2.6	2.0	2.2	1.0	1.3	1.6	3.1	4.7	4.3		34
North Northwest	9.3	7.2	5.2	3.6	3.4	2.8	1.9	2.3	3.7	5.8	8.1	8.0		34
Calm	3.7	2.2	1.6	0.9	1.0	2.1	2.2	2.4	1.4	2.0	1.8	3.0		34
VISIBILITY														
Days with Visibility equal to or less than 1/4 mile	2	3	2	2	2	1	1	2	2	3	2	2	23	27

RICHMOND, VIRGINIA (37°30'N., 77°20'W.) Elevation 164 ft. (50.0m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1019.9	1018.9	1017.1	1016.4	1016.5	1016.0	1016.5	1016.5	1018.6	1019.1	1019.1	1020.6	1017.9	20
TEMPERATURE (DEGREES F)														
Mean	37.5	39.4	46.9	57.8	66.5	74.2	77.9	76.3	70.0	59.3	49.0	39.0	57.8	30
Mean Daily Maximum	47.4	49.9	58.2	70.3	78.4	85.4	88.2	86.6	80.9	71.2	60.6	49.1	68.8	30
Mean Daily Minimum	27.6	28.8	35.5	45.2	54.5	62.9	67.5	65.9	59.0	47.4	37.3	28.8	46.7	30
Extreme Highest	80	83	93	96	100	104	104	102	103	99	86	80	104	46
Extreme Lowest	-12	-10	11	26	31	40	51	46	35	21	10	-1	-12	46
RELATIVE HUMIDITY														
Average Percentage (0700 l.s.t.)	81	79	78	75	79	82	85	88	89	89	84	81	83	41
Average Percentage (1300 l.s.t.)	57	52	48	45	50	53	57	57	56	52	50	55	53	41
CLOUD COVER														
Average Amount (Tenths)	6.5	6.2	6.2	6.1	6.3	6.0	6.2	6.0	5.7	5.3	5.6	6.2	6.0	30
Mean Number of Days with Clear Skies	8	9	8	8	7	7	7	7	10	12	10	10	103	30
Mean Number of Days with Cloudy Skies	16	13	14	13	13	11	12	12	12	12	12	15	155	30
PRECIPITATION														
Mean Amount (Inches)	2.86	3.01	3.38	2.77	3.42	3.52	5.63	5.06	3.58	2.94	3.20	3.22	42.59	30
Greatest Amount (Inches)	5.95	5.61	8.04	5.32	8.87	9.24	18.87	14.10	10.98	9.39	7.64	7.07	61.31	38
Least Amount (Inches)	1.08	0.98	0.94	0.64	0.87	0.91	0.52	0.52	0.69	0.30	0.36	0.72	22.91	38
Maximum in 24 hrs. (Inches)	3.31	1.91	2.04	2.07	2.53	4.61	5.73	8.79	3.82	6.50	4.07	3.16	8.79	38
Mean Amount of Snow (Inches)	5.2	3.5	2.9	0.1	0.0	0.0	0.0	0.0	0.0	t	0.4	2.2	14.3	38
Maximum Snowfall in 24 hrs. (Inches)	21.6	9.2	12.1	2.0	0.0	0.0	0.0	0.0	0.0	t	7.3	7.5	21.6	38
Mean Number Days with Snow (One Inch or More)	1	1	1	**	0	0	0	0	0	0	**	1	4	38
0.01 Inch or More, Mean Number of Days	10	9	11	9	11	10	11	10	8	7	8	9	114	38
WIND														
Mean Wind Speed (Knots) (0700 l.s.t.)	6.3	6.5	7.0	6.9	6.4	6.1	5.5	5.2	5.5	5.5	5.7	5.7		20
Mean Wind Speed (Knots) (1300 l.s.t.)	8.5	9.1	9.7	9.6	8.3	7.9	7.5	7.1	7.7	8.0	8.2	8.3		20
Direction (Percentage of Obs.): at 0700 l.s.t.														
North	9.5	8.8	8.1	9.1	8.8	9.1	8.3	11.3	16.4	15.9	9.7	8.5		20
North Northeast	7.6	10.6	7.8	6.8	9.9	6.7	6.8	9.2	11.8	10.5	7.3	8.3		20
Northeast	4.7	7.3	6.6	4.8	7.2	5.9	4.5	4.7	5.2	4.5	4.0	6.2		20
East Northeast	2.2	3.3	4.6	3.6	3.7	2.3	2.2	2.7	1.8	2.1	1.5	1.8		20
East	1.7	2.4	2.8	2.9	2.2	2.5	2.2	2.6	2.5	1.2	1.9	1.7		20
East Southeast	0.8	2.1	1.6	1.7	2.1	1.7	1.8	1.3	1.1	1.0	1.4	1.0		20
Southeast	2.3	2.9	3.0	4.0	3.8	2.5	2.0	2.7	2.6	2.0	2.3	2.4		20
South Southeast	3.1	3.9	4.1	3.6	3.7	3.7	3.2	3.3	3.3	2.3	3.6	3.3		20
South	10.7	8.8	7.7	8.9	7.9	8.4	8.9	9.4	9.6	8.2	12.2	11.4		20
South Southwest	10.9	8.2	8.9	11.2	10.3	10.1	14.5	10.9	8.2	7.5	9.8	9.6		20
Southwest	10.8	9.6	9.0	11.4	11.3	13.7	15.7	11.2	7.3	8.4	8.5	10.2		20
West Southwest	8.9	7.7	7.9	8.0	7.9	9.6	9.3	6.5	4.4	3.5	9.1	8.0		20
West	6.5	5.1	7.0	5.4	5.1	5.2	4.7	4.5	3.3	5.2	6.1	6.0		20
West Northwest	4.5	4.4	4.4	4.0	3.0	3.6	3.6	3.0	3.2	4.1	5.8	4.7		20
Northwest	5.7	5.6	6.7	5.6	5.0	5.6	4.1	5.6	5.7	7.8	6.2	7.1		20
North Northwest	7.4	6.4	7.2	6.6	6.0	6.7	5.3	7.0	9.5	11.4	6.8	7.4		20
Calm	2.6	2.9	2.4	2.2	2.2	2.3	3.2	4.1	4.1	4.5	3.8	2.4		20
Direction (Percentage of Obs.):at 1300 l.s.t.														
North	8.0	7.3	4.7	5.1	5.9	6.4	6.9	7.9	8.8	10.5	6.8	7.2		20
North Northeast	5.6	6.9	5.6	5.4	6.5	6.4	7.5	7.9	11.6	10.9	5.6	8.0		20
Northeast	5.3	5.6	5.1	3.5	7.2	6.1	7.6	7.6	9.3	8.8	4.9	5.1		20
East Northeast	2.0	3.4	4.2	3.6	4.1	4.3	8.2	6.0	5.3	4.5	2.5	1.8		20
East	2.3	2.8	3.5	3.0	5.0	4.2	7.1	5.0	4.5	3.5	2.7	1.6		20
East Southeast	1.3	1.9	2.2	1.9	3.1	3.5	6.8	3.0	3.0	2.8	2.2	1.2		20
Southeast	3.0	3.2	2.4	4.4	5.0	4.5	7.7	4.4	4.4	2.9	3.7	2.0		20
South Southeast	3.8	5.3	3.8	4.5	5.3	4.8	7.6	6.3	5.4	3.9	5.5	4.2		20
South	7.3	7.1	5.5	8.1	7.2	7.7	7.4	8.5	7.9	6.3	7.3	9.0		20
South Southwest	8.7	7.1	6.9	9.8	8.9	8.0	8.3	8.2	8.2	8.5	9.3	9.8		20
Southwest	10.9	9.2	11.7	9.5	9.3	11.7	8.2	10.0	8.7	8.7	11.4	11.3		20
West Southwest	10.4	9.4	10.0	10.9	9.5	10.9	7.9	6.5	5.6	6.1	10.1	9.6		20
West	8.9	9.0	9.5	8.8	6.4	6.2	6.6	3.6	4.0	5.3	6.1	7.6		20
West Northwest	7.1	7.9	9.0	8.3	6.0	4.8	7.0	3.0	3.1	4.8	6.4	6.3		20
Northwest	7.2	6.5	8.6	7.5	5.4	4.8	6.4	4.2	4.2	4.4	7.8	8.0		20
North Northwest	7.5	6.3	6.9	5.4	4.6	5.4	6.8	7.0	5.5	7.5	7.3	6.8		20
Calm	0.8	0.9	0.5	0.2	0.7	0.5	0.7	0.7	0.3	0.5	0.4	0.5		20
VISIBILITY														
Days with Visibility equal to or less than 1/4 mile	3	2	2	2	2	2	2	3	3	4	2	3	29	46

WASHINGTON, D.C. (38°51'N., 77°02'W.) Elevation 10 ft. (3.1m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1019.3	1017.9	1016.3	1016.1	1016.0	1015.4	1016.2	1016.4	1018.7	1018.9	1018.3	1019.5	1017.4	30
TEMPERATURE (DEGREES F)														
Mean	35.6	37.3	45.1	56.4	66.2	74.6	78.7	77.1	70.6	59.8	48.0	37.4	57.3	30
Mean Daily Maximum	43.5	46.0	55.0	67.1	76.6	84.6	88.2	86.6	80.2	69.8	57.2	45.2	66.7	30
Mean Daily Minimum	27.7	28.6	35.2	45.7	55.7	64.6	69.1	67.6	61.0	49.7	38.8	29.5	47.8	30
Extreme Highest	76	77	86	91	97	100	101	99	96	91	86	74	101	15
Extreme Lowest	3	4	16	27	36	47	56	51	39	29	20	10	3	15
RELATIVE HUMIDITY														
Average Percentage (0700 l.s.t.)	69	68	68	68	72	76	75	78	79	79	73	71	73	15
Average Percentage (1300 l.s.t.)	54	53	49	48	51	53	52	53	55	51	52	57	52	15
CLOUD COVER														
Average Amount (Tenths)	6.6	6.4	6.4	6.4	6.3	5.9	6.0	5.7	5.5	5.2	6.0	6.5	6.1	27
Mean Number of Days with Clear Skies	8	7	7	7	7	8	7	10	11	12	9	9	102	27
Mean Number of Days with Cloudy Skies	16	14	15	14	13	11	11	12	11	12	13	16	158	27
PRECIPITATION														
Mean Amount (Inches)	2.62	2.45	3.33	2.86	3.68	3.48	4.12	4.67	3.08	2.66	2.90	3.04	38.89	30
Greatest Amount (Inches)	5.08	5.71	7.43	5.97	10.69	11.53	11.06	14.31	12.36	8.18	6.70	6.54	57.54	34
Least Amount (Inches)	0.31	0.80	0.64	0.26	1.06	1.24	0.93	0.55	0.20	*	0.37	0.22	26.94	34
Maximum in 24 hrs. (Inches)	1.73	1.77	3.43	3.08	4.32	7.19	4.69	6.39	5.31	4.96	2.63	2.08	7.19	32
Mean Amount of Snow (Inches)	4.7	5.1	2.4	1	1	0.0	0.0	0.0	0.0	1	0.7	3.9	16.8	32
Maximum Snowfall in 24 hrs. (Inches)	13.8	14.4	7.9	0.6	1	0.0	0.0	0.0	0.0	1	6.9	11.4	14.4	32
Mean Number of Days with Snow (One Inch or More)	2	1	1	0	0	0	0	0	0	0	**	1	5	32
0.01 Inch or More, Mean Number of Days	11	9	11	10	11	9	10	9	8	7	8	9	112	34
WIND														
Mean Wind Speed (Knots) (0700 l.s.t.)	7.4	7.9	8.4	7.9	6.8	6.0	5.2	5.1	5.5	5.9	6.5	6.9		29
Mean Wind Speed (Knots) (1300 l.s.t.)	9.5	10.7	11.2	10.4	8.7	7.5	7.0	6.8	7.5	8.2	9.5	9.4		29
Direction (Percentage of Obs.): at 0700 l.s.t.														
North	5.1	6.6	6.2	5.7	6.8	5.8	6.3	7.6	9.4	9.3	5.2	4.7		29
North Northeast	3.7	4.1	4.5	4.1	5.4	4.7	4.8	6.0	9.1	7.4	4.6	3.2		29
Northeast	4.2	5.3	5.7	5.4	6.2	4.2	4.2	5.8	6.6	7.2	4.0	3.6		29
East Northeast	2.7	4.1	5.0	5.6	4.4	3.5	2.2	3.0	3.2	4.5	2.8	2.5		29
East	1.9	3.5	4.5	4.1	4.3	3.1	2.1	1.8	2.9	2.5	2.1	2.9		29
East Southeast	1.3	1.7	2.4	2.5	2.2	1.6	1.0	1.9	1.3	0.8	1.8	2.0		29
Southeast	1.1	1.6	2.2	2.0	2.3	1.5	1.6	1.2	2.0	1.4	1.8	1.5		29
South Southeast	1.3	1.9	2.1	2.2	1.9	2.1	2.9	2.2	1.6	1.4	2.2	1.7		29
South	5.0	4.4	4.8	5.9	5.6	4.3	5.6	5.3	5.7	3.6	5.8	4.8		29
South Southwest	8.3	5.8	7.3	8.8	7.8	10.5	12.1	8.4	8.8	6.4	8.3	7.5		29
Southwest	8.4	8.0	7.8	8.9	10.4	12.5	10.7	9.5	7.3	8.7	7.1	7.5		29
West Southwest	3.4	3.9	3.4	3.8	5.3	5.8	5.5	4.8	2.8	3.5	4.3	4.6		29
West	6.9	8.0	6.3	5.9	6.8	5.8	5.9	6.8	4.0	6.4	8.3	6.8		29
West Northwest	9.0	10.5	8.1	7.7	6.6	5.8	5.3	4.8	3.6	6.2	9.0	9.4		29
Northwest	12.8	9.6	11.5	9.3	6.7	7.6	5.9	6.4	6.5	8.2	9.6	12.9		29
North Northwest	6.5	6.0	7.6	5.7	4.4	4.8	4.1	5.0	6.3	5.8	4.8	7.2		29
Calm	18.3	15.0	10.3	12.2	12.8	16.6	19.9	19.6	19.0	16.6	18.2	17.3		29
Direction (Percentage of Obs.): at 1300 l.s.t.														
North	5.1	4.1	5.3	4.7	4.4	4.2	4.3	4.5	7.1	6.4	4.5	4.5		29
North Northeast	2.7	3.1	2.8	2.4	4.5	3.9	3.4	5.4	6.2	5.1	3.1	2.5		29
Northeast	2.8	4.1	3.1	3.2	3.8	3.5	3.4	5.3	6.2	6.3	2.6	3.3		29
East Northeast	2.1	3.3	3.6	4.5	3.7	3.9	2.9	4.3	5.2	4.6	2.9	1.7		29
East	2.6	3.2	4.2	4.8	5.5	4.3	4.6	4.6	6.6	4.6	2.8	2.5		29
East Southeast	1.6	2.7	3.5	3.8	5.1	3.5	3.8	3.6	4.6	3.6	2.6	2.1		29
Southeast	1.3	2.3	2.8	3.4	3.5	3.9	4.9	3.8	3.7	3.0	2.5	1.9		29
South Southeast	1.7	2.2	2.0	2.9	3.9	4.3	4.7	3.9	2.6	2.8	4.2	2.2		29
South	5.0	5.5	5.1	6.7	6.0	7.5	7.8	6.9	6.1	5.3	6.3	5.7		29
South Southwest	9.0	7.3	8.0	8.5	9.1	9.5	10.6	8.9	8.3	8.0	8.8	8.0		29
Southwest	8.3	7.5	8.1	6.9	9.0	10.7	9.3	7.7	8.9	7.7	7.8	8.2		29
West Southwest	4.9	4.8	4.7	5.6	5.7	5.9	7.2	5.9	4.0	4.1	5.4	5.2		29
West	8.2	9.8	8.2	8.2	7.2	6.9	7.6	6.8	5.3	6.0	9.3	8.0		29
West Northwest	14.2	14.7	12.8	12.5	9.1	7.9	6.7	7.0	6.3	8.3	12.1	12.4		29
Northwest	13.4	12.8	13.5	10.5	7.5	7.2	5.9	7.6	8.1	9.8	12.7	14.8		29
North Northwest	7.6	6.3	7.7	7.5	4.7	4.1	3.6	4.7	4.0	6.7	5.4	8.3		29
Calm	9.3	6.2	4.6	3.9	7.2	9.0	9.4	9.2	6.7	7.6	7.0	8.7		29
VISIBILITY														
Days with Visibility equal to or less than 1/4 mile	2	2	1	1	*	*	*	*	*	2	1	2	13	27

BALTIMORE, MARYLAND (39°11'N., 76°40'W.) Elevation 148 ft. (45.1m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1019.9	1017.6	1016.7	1016.0	1017.5	1016.1	1015.8	1016.5	1018.4	1018.7	1018.2	1019.1	1017.5	11
TEMPERATURE (DEGREES F)														
Mean	33.4	34.8	42.8	53.8	63.7	72.4	76.6	74.9	68.5	57.4	46.1	35.3	55.0	30
Mean Daily Maximum	41.9	43.9	53.0	65.2	74.8	83.2	86.7	85.1	79.0	68.3	56.1	43.9	65.1	30
Mean Daily Minimum	24.9	25.7	32.5	42.4	52.5	61.6	66.5	64.7	57.9	46.4	36.0	26.6	44.8	30
Extreme Highest	75	76	85	94	98	100	102	102	99	92	83	74	102	25
Extreme Lowest	-7	-1	6	20	32	40	52	48	35	25	13	0	-7	25
RELATIVE HUMIDITY														
Average Percentage (0700 l.s.t.)	72	72	71	72	77	80	81	84	85	82	77	75	77	22
Average Percentage (1300 l.s.t.)	58	56	51	49	52	53	53	55	55	53	54	59	54	22
CLOUD COVER														
Average Amount (Tenths)	6.3	6.2	6.3	6.2	6.2	5.7	5.6	5.6	5.3	5.0	5.9	6.4	5.9	25
Mean Number of Days with Clear Skies	8	8	7	7	7	8	9	10	11	13	9	8	105	25
Mean Number of Days with Cloudy Skies	15	13	14	14	13	10	10	11	10	11	13	16	150	25
PRECIPITATION														
Mean Amount (Inches)	2.91	2.81	3.69	3.07	3.61	3.77	4.07	4.21	3.12	2.81	3.13	3.26	40.46	30
Greatest Amount (Inches)	5.27	6.21	6.80	8.15	7.10	9.95	8.18	18.35	8.62	6.88	7.68	7.44	56.57	25
Least Amount (Inches)	0.29	0.72	0.93	1.61	0.43	0.15	0.30	0.77	0.21	*	0.68	0.20	27.89	25
Maximum in 24 hrs. (Inches)	2.54	2.18	3.18	2.80	3.64	5.23	5.86	7.82	4.33	3.49	3.43	2.37	7.82	25
Mean Amount of Snow (Inches)	5.1	6.3	4.7	0.1	t	0.0	0.0	0.0	0.0	t	1.1	4.6	21.9	25
Maximum Snowfall in 24 hrs. (Inches)	12.1	15.5	13.0	0.4	t	0.0	0.0	0.0	0.0	t	8.4	14.1	15.5	25
Mean Number of Days with Snow (One Inch or More)	2	2	2	**	0	0	0	0	0	0	**	1	8	25
0.01 Inch or More, Mean Number of Days	10	9	11	11	11	9	8	10	8	7	9	9	113	25
WIND														
Mean Wind Speed (Knots)	9.5	10.1	10.9	10.5	9.1	8.6	7.8	8.0	8.1	8.9	8.8	8.7	9.0	10
Direction (Percentage of Obs.)														
North	5	5	5	5	4	5	4	6	7	7	5	4	5	10
North Northeast	2	2	3	2	3	3	2	4	4	5	2	2	3	10
Northeast	5	4	5	6	6	4	4	6	6	7	4	5	5	10
East Northeast	4	6	7	7	6	4	4	4	5	6	4	5	5	10
East	3	5	6	6	6	5	4	5	5	3	4	4	5	10
East Southeast	2	3	3	4	4	3	3	4	3	2	2	2	3	10
Southeast	4	4	4	5	5	5	4	4	5	4	4	3	4	10
South Southeast	3	4	4	5	5	5	5	4	6	4	3	3	4	10
South	6	4	4	7	7	9	9	8	10	6	6	5	7	10
South Southwest	5	5	4	5	6	6	8	6	7	5	6	6	6	10
Southwest	7	6	5	8	8	7	10	8	8	8	8	10	8	10
West Southwest	5	5	5	6	6	8	8	7	6	6	7	7	6	10
West	10	9	9	9	9	9	10	9	7	8	11	11	9	10
West Northwest	15	14	15	10	8	10	8	7	6	10	13	14	11	10
Northwest	13	13	13	9	8	10	9	9	8	9	10	10	10	10
North Northwest	8	6	6	5	4	5	4	5	6	6	6	5	5	10
Calm	4	4	2	2	2	3	3	3	3	3	5	5	3	10
Direction (Mean Speed, Knots)														
North	8.3	8.2	9.8	9.6	8.5	8.2	7.2	8.0	8.4	8.9	8.9	8.5	8.6	10
North Northeast	8.2	8.9	9.6	9.6	9.1	9.0	7.8	8.5	8.3	9.3	8.8	8.0	8.8	10
Northeast	9.7	8.9	9.5	10.2	9.1	8.7	7.7	9.3	8.4	10.2	7.3	8.5	9.1	10
East Northeast	8.3	9.4	10.4	10.6	9.8	8.8	8.5	8.9	8.9	11.7	7.7	8.1	9.5	10
East	6.3	7.4	9.2	9.8	8.6	8.2	7.9	8.6	7.9	8.0	7.1	6.5	8.1	10
East Southeast	6.2	6.3	7.8	8.9	8.6	8.4	7.8	8.1	7.6	7.7	6.2	5.7	7.6	10
Southeast	6.9	7.8	9.7	9.6	8.5	8.4	7.7	8.1	7.9	7.7	7.5	8.3	8.2	10
South Southeast	7.6	8.8	11.0	11.0	9.5	9.4	9.0	8.6	9.6	9.2	9.2	8.1	9.4	10
South	7.7	8.2	9.2	10.2	8.5	8.6	8.2	8.3	8.7	8.2	8.4	7.0	8.5	10
South Southwest	9.1	10.3	11.3	11.2	9.4	8.5	8.8	8.2	8.9	8.7	9.5	8.5	9.2	10
Southwest	8.6	9.6	9.9	10.8	8.9	7.9	8.2	7.6	7.8	8.1	8.2	8.1	8.6	10
West Southwest	8.8	8.7	10.4	10.2	9.2	9.1	7.7	7.6	7.7	8.0	8.3	8.1	8.6	10
West	10.9	12.8	11.9	11.2	10.0	8.9	7.6	7.8	7.5	8.6	9.5	10.0	9.7	10
West Northwest	12.9	14.6	13.9	12.9	11.1	9.5	8.6	8.2	8.3	10.0	11.4	11.7	11.5	10
Northwest	11.5	12.3	12.5	12.1	10.1	9.4	7.9	8.3	8.8	10.2	10.9	11.1	10.6	10
North Northwest	11.7	10.4	10.8	11.2	9.7	8.9	7.8	8.1	8.6	9.3	9.9	9.7	9.8	10
VISIBILITY														
Days with Visibility equal to or less than 1/4 mile	4	4	3	2	2	1	1	1	2	3	3	4	30	25

METEOROLOGICAL TABLE FOR COASTAL AREA OFF ATLANTIC CITY
Boundaries: 38°N. to 40°N., between 70°W. and the coast

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)	5.6	5.9	3.9	2.0	.7	*	*	*	1.2	2.5	3.5	5.5	2.7
Wave height ≥ 10 feet (1)	14.1	16.7	11.7	7.4	3.2	1.5	1.2	3.2	5.6	10.0	10.5	13.4	8.2
Visibility < 2 naut. mi. (1)	4.2	6.3	6.2	8.1	10.8	9.5	4.1	2.6	2.6	2.5	2.2	2.7	5.2
Precipitation (1)	9.6	10.3	7.2	5.9	5.2	3.8	3.3	4.4	4.9	4.9	7.3	8.1	6.2
Temperature ≥ 85°F (1)	0	0	0	0	0	*	1.2	1.6	*	0	0	0	*
Mean Temperature (°F)	42.4	40.8	44.0	49.3	56.5	67.1	74.2	75.1	70.7	62.8	54.8	46.5	57.1
Temperature ≤ 32°F (1)	13.6	16.2	3.8	*	0	0	0	0	0	0	*	4.8	3.3
Mean relative humidity (%)	80	79	79	82	84	85	84	82	80	77	77	77	81
Sky overcast or obscured (1)	42.5	42.6	34.1	34.3	32.7	27.7	23.8	22.1	23.9	24.8	32.0	38.9	31.6
Mean cloud cover (eighths)	5.3	5.9	4.4	4.2	4.3	4.1	4.2	4.2	4.0	4.1	4.8	5.4	4.5
Mean sea-level pressure (2)	1,017	1,017	1,016	1,016	1,017	1,016	1,017	1,016	1,018	1,018	1,017	1,018	1,017
Extreme max. sea-level pressure (2)	1,045	1,042	1,042	1,040	1,039	1,034	1,031	1,033	1,036	1,038	1,040	1,043	1,045
Extreme min. sea-level pressure (2)	980	978	967	985	988	998	997	976	969	988	979	982	967
Prevailing wind direction	NW	NW	NW	SW	SW	SW	SW	SW	NE	NE	NW	NW	SW
Thunder and lightning (1)	*	*	*	*	.9	1.2	1.8	1.8	1.0	.7	.6	*	.8

METEOROLOGICAL TABLE FOR COASTAL AREA OFF NORFOLK
Boundaries: 36°N. to 38°N., between 73°W. and the coast

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Wind ≥ 34 knots (1)	4.0	4.1	3.4	1.5	*	*	*	*	1.2	1.8	2.8	3.8	2.0
Wave height ≥ 10 feet (1)	11.0	11.4	9.1	5.2	2.4	1.7	1.0	2.3	4.7	7.7	7.4	9.4	6.1
Visibility < 2 naut. mi. (1)	3.1	4.9	5.7	5.9	5.7	4.8	1.3	1.0	1.8	1.8	2.0	2.1	3.3
Precipitation (1)	8.5	7.5	6.1	5.6	4.2	3.8	4.2	3.8	4.4	5.4	5.5	6.0	5.4
Temperature ≥ 85°F (1)	0	0	0	0	*	1.2	4.0	3.8	1.4	*	0	2.2	.8
Mean Temperature (°F)	47.0	46.7	48.6	54.9	62.1	71.5	77.3	77.6	73.4	65.9	57.6	50.2	61.2
Temperature ≤ 32°F (1)	6.2	5.8	1.7	0	0	0	0	0	0	0	*	2.2	1.3
Mean relative humidity (%)	76	76	77	79	81	83	83	81	79	76	74	74	78
Sky overcast or obscured (1)	36.4	35.3	33.0	29.6	25.5	22.8	20.8	20.6	21.0	22.8	25.4	32.3	27.1
Mean cloud cover (eighths)	4.9	4.7	4.4	4.1	4.1	4.1	4.3	4.3	4.0	3.9	4.3	4.8	4.3
Mean sea-level pressure (2)	1,019	1,017	1,017	1,016	1,017	1,017	1,017	1,017	1,018	1,018	1,018	1,019	1,017
Extreme max. sea-level pressure (2)	1,045	1,043	1,043	1,040	1,037	1,032	1,033	1,030	1,034	1,040	1,041	1,044	1,045
Extreme min. sea-level pressure (2)	983	976	983	988	994	977	992	975	985	992	984	983	975
Prevailing wind direction	N	N	N	SW	S	S	SW	SW	NE	N	N	NW	N
Thunder and lightning (1)	*	*	*	*	1.4	1.6	2.2	2.5	1.3	.7	*	*	1.0

METEOROLOGICAL TABLE FOR CHESAPEAKE BAY

Weather elements	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Precipitation (1)	8.7	11.3	8.6	7.7	5.7	4.8	6.6	6.5	8.6	5.5	7.0	10.7	7.6
Thunder and lightning (1)	0	0	0	0.3	0.4	0.4	0.7	0.7	0	0	0.2	0	0.2
Visibility < 2 mi. (1)	10.0	8.2	6.1	7.4	5.1	3.9	3.6	3.2	4.1	4.6	9.4	12.0	6.5
Sky overcast or obscured (1)	39.4	39.2	34.6	32.6	28.0	28.3	28.6	30.2	30.0	26.6	32.4	40.2	32.5
Mean sea-level pressure (2)	1,021	1,018	1,019	1,018	1,017	1,016	1,017	1,017	1,018	1,019	1,019	1,019	1,018
Wind ≥ 34 knots (1)	0.3	0.6	0.6	0.2	0.3	0.1	0.0	0.2	1.2	1.0	1.1	0.7	0.5
Waves ≥ 8 feet (1)	2.4	2.8	1.3	1.0	0.3	0	0	2.0	2.7	1.3	0.4	5.1	1.6
Temperature Average °F	41.4	43.0	48.9	55.9	66.9	75.9	78.4	77.4	75.0	64.9	53.1	43.0	60.3

(1) Percentage frequency.
(2) Millibars.
* 0.0-0.5%
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.

MEAN SURFACE WATER TEMPERATURES (T) AND DENSITIES (D)

Stations	Years	Jan		Feb		Mar		Apr		May		June		July		Aug		Sept		Oct		Nov		Dec		Mean	
		(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}	(T) °C	(D) σ_{15}
Sandy Hook, N.J. 40°28'N., 74°01'W.	32	1.6	17.0	1.4	16.9	4.1	15.9	9.1	15.0	14.6	16.2	20.1	17.7	23.5	19.0	23.5	19.1	20.8	19.2	15.0	19.1	9.3	18.4	3.8	17.5	12.2	17.6
Atlantic City, N.J. 39°21'N., 74°25'W.	56	2.9	23.1	2.3	23.2	4.4	23.1	8.5	23.0	13.2	23.2	17.9	23.5	20.7	23.6	21.9	23.5	20.9	23.4	16.3	23.4	10.9	23.4	5.3	23.2	12.1	23.3
Breakwater Hbr., Del. 38°47'N., 75°06'W.	25	2.8	20.9	2.6	21.0	5.3	20.6	9.9	20.4	15.1	20.9	20.1	21.3	22.9	22.1	23.1	22.1	21.7	22.0	16.8	22.1	11.1	21.9	5.3	21.4	13.1	21.4
Philadelphia, Pa. 39°57'N., 75°08'W.	39	2.3	-0.6	2.5	-0.6	5.4	-0.5	10.8	-0.4	17.5	-0.2	23.3	-0.2	26.3	-0.2	26.1	-0.2	23.3	-0.2	17.5	-0.4	10.8	-0.4	4.8	-0.6	14.2	-0.4
Kiptopeke Beach, Va. 37°10'N., 75°59'W.	19	3.9	19.7	3.9	19.4	6.8	18.6	11.8	18.0	17.4	18.2	22.4	19.0	25.2	19.4	25.2	20.3	23.1	20.5	17.9	20.4	11.9	20.0	6.6	19.7	14.7	19.4
Cape Charles (town), Va. 37°16'N., 76°01'W.	5	5.5	16.0	5.4	15.6	7.5	15.2	12.8	14.8	18.1	14.6	23.8	15.7	26.6	16.9	26.2	17.4	24.0	17.8	18.8	17.7	12.5	17.6	6.7	16.8	15.7	16.3
Virginia Beach, Va. 36°50'N., 75°58'W.	9	5.3	20.4	4.4	19.8	6.3	19.6	10.7	19.2	15.7	19.0	20.6	18.8	23.0	19.8	23.7	20.3	22.4	20.1	18.6	20.2	13.7	20.6	8.3	20.6	14.4	19.9
Old Pt. Comfort, Va. 37°00'N., 76°18'W.	9	5.8	14.0	5.8	13.2	9.1	12.0	14.0	12.3	19.5	12.8	23.9	13.7	26.7	15.1	26.2	15.7	23.9	15.8	18.8	15.8	12.7	15.9	7.3	14.9	16.1	14.3
Little Creek, Va. 36°55'N., 76°11'W.	6	4.2	15.8	5.1	15.2	8.3	14.3	12.9	14.3	18.7	15.0	23.4	16.2	26.1	17.7	26.6	17.6	24.1	17.6	18.8	17.6	12.9	17.0	7.3	16.4	15.7	16.2
Richmond, Va. 37°32'N., 77°25'W.	21	4.7	-0.7	5.6	-0.7	8.9	-0.7	14.8	-0.6	20.7	-0.5	25.2	-0.4	28.1	-0.4	27.4	-0.5	24.3	-0.5	18.0	-0.6	11.3	-0.7	5.5	-0.6	16.2	-0.6
Gloucester Pt. Va. 37°15'N., 76°30'W.	18	4.3	14.7	4.6	13.9	7.7	13.0	13.1	12.6	19.2	12.6	23.8	13.3	26.5	14.7	26.6	15.4	24.2	15.6	18.8	15.6	12.7	15.6	7.7	15.2	15.7	14.4
Washington, D.C. 38°52'N., 77°01'W.	26	2.8	-0.9	3.5	-0.9	7.7	-0.8	14.1	-0.8	20.2	-0.7	25.3	-0.6	28.3	-0.5	27.6	-0.6	24.6	-0.6	18.3	-0.7	11.4	-0.8	4.8	-0.8	15.7	-0.7
Crisfield, Md. 37°58'N., 75°52'W.	2	2.6	11.9	4.4	17.3	7.5	11.1	15.0	10.9	21.9	11.6	26.0	11.6	27.9	11.7	28.4	11.6	24.7	12.2	18.4	12.8	10.7	12.4	4.0	12.0	16.0	12.3
Solomons, Md. 38°19'N., 76°27'W.	32	3.3	10.7	3.1	10.3	6.0	9.3	11.5	7.8	18.2	7.5	23.6	7.8	26.7	8.8	26.7	9.5	24.2	10.5	18.6	11.4	12.4	12.0	6.3	11.4	15.0	9.8
Cambridge, Md. 38°34'N., 76°04'W.	8	4.1	6.6	4.1	6.1	7.1	6.1	13.0	5.6	19.1	5.2	24.1	5.3	27.1	5.6	26.4	5.7	23.3	7.0	17.4	8.0	11.4	8.4	4.9	7.6	15.2	5.9
Annapolis, Md. 38°59'N., 76°29'W.	23	2.9	7.9	2.8	7.5	6.1	6.5	12.0	4.8	18.3	4.6	23.6	5.2	26.9	6.2	26.6	7.0	23.8	8.1	18.3	9.3	11.6	9.8	5.4	8.6	14.9	7.1
Baltimore, Md. 39°16'N., 76°35'W.	56	3.0	6.8	2.8	6.7	5.9	5.5	11.7	3.8	17.9	3.6	23.4	3.8	26.4	4.5	26.4	5.3	23.9	6.5	18.6	7.5	12.2	7.7	6.1	7.3	14.9	5.8

F (Fahrenheit) = 1.8C (Celsius) + 32

Density as used in this table is the specific gravity of the sea water or the ratio between the weight of a sea-water sample and the weight of an equal volume of distilled water at 15°C (59°F). These figures representing density at 15°C (ρ_{15}) are expressed in terms of sigma-t (σ_t) where t = 15°C and σ_{15} = (ρ_{15} - 1) 1000. Thus, for ρ_{15} = 1.0238, σ_{15} = 23.8. Obtain the pamphlet, "Surface Water Temperature and Density, Atlantic Coast, North and South America, C&GS Publication 31-1," for greater detail; for sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

DETERMINATION OF WIND SPEED BY SEA CONDITION

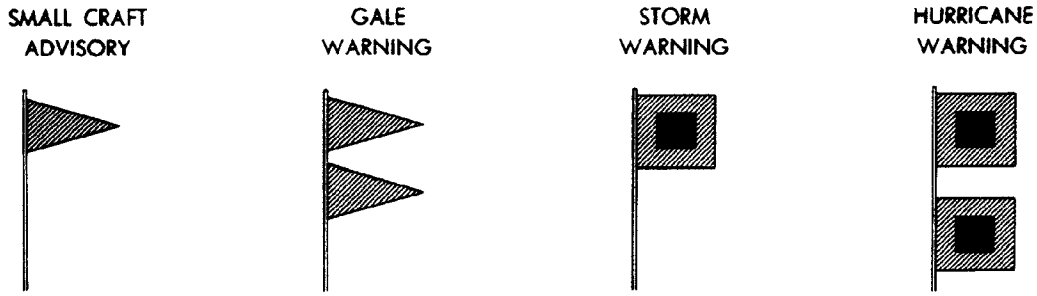
Miles per hour	Knots	Descriptive	Sea Conditions	Wind force (Beaufort)	Probable wave height (in ft.)
0-1	0-1	Calm	Sea smooth and mirror-like.	0	
1-3	1-3	Light air	Scale-like ripples without foam crests.	1	1/4
4-7	4-6	Light breeze	Small, short wavelets; crests have a glassy appearance and do not break.	2	1/2
8-12	7-10	Gentle breeze	Large wavelets; some crests begin to break; foam of glassy appearance. Occasional white foam crests.	3	2
13-18	11-16	Moderate breeze	Small waves, become longer; fairly frequent white foam crests.	4	4
19-24	17-21	Fresh breeze	Moderate waves, taking a more pronounced long form; many white foam crests; there may be some spray.	5	6
25-31	22-27	Strong breeze	Large waves begin to form; white foam crests are more extensive everywhere; there may be some spray.	6	10
32-38	28-33	Near gale	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind; spindrift begins.	7	14
39-46	34-40	Gale	Moderately high waves of greater length; edges of crests break into spindrift; foam is blown in well-marked streaks along the direction of the wind.	8	18
47-54	41-47	Strong gale	High waves; dense streaks of foam along the direction of the wind; crests of waves begin to topple, tumble, and roll over; spray may reduce visibility.	9	23
55-63	48-55	Storm	Very high waves with long overhanging crests. The resulting foam in great patches is blown in dense white streaks along the direction of the wind. On the whole, the surface of the sea is white in appearance. The tumbling of the sea becomes heavy and shocklike. Visibility is reduced.	10	29
64-72	56-63	Violent storm	Exceptionally high waves that may obscure small and medium-sized ships. The sea is completely covered with long white patches of foam lying along the direction of the wind. Everywhere the edges of the wave crests are blown into froth. Visibility is reduced.	11	37
73 or more	64 or more	Hurricane	The air is filled with foam and spray. Sea completely white with driving spray; visibility very much reduced.	12	45

ATMOSPHERIC PRESSURE CONVERSION TABLE

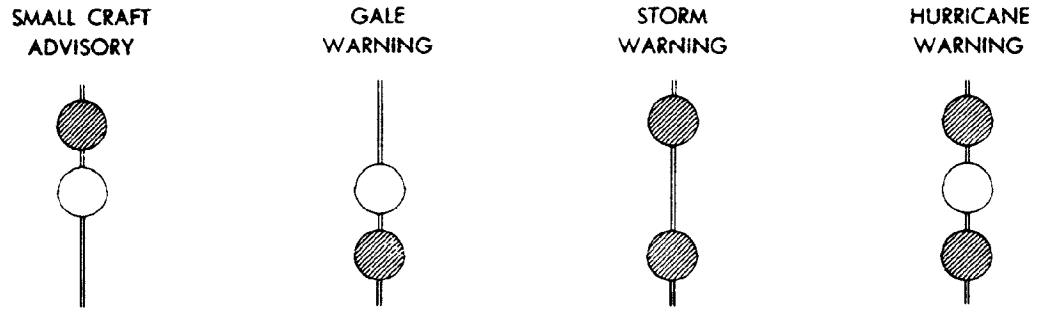
Inches	Millibars	Inches	Millibars	Inches	Millibars
28.44	963	29.32	993	30.21	1023
28.53	966	29.41	996	30.30	1026
28.62	969	29.50	999	30.39	1029
28.70	972	29.59	1002	30.48	1032
28.79	975	29.68	1005	30.56	1035
28.88	978	29.77	1008	30.65	1038
28.97	981	29.86	1011	30.74	1041
29.06	984	29.94	1014	30.83	1044
29.15	987	30.03	1017	30.92	1047
29.24	990	30.12	1020	31.01	1050

NATIONAL WEATHER SERVICE COASTAL WARNING DISPLAYS

DAYTIME SIGNALS



NIGHT (LIGHT) SIGNALS



CP2011

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: 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. No visual displays will be used in connection with the Special Marine Warning Bulletin; 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.

ATLANTIC OCEAN DISTANCES
MONTREAL, CANADA, TO PANAMA CANAL ZONE
(Nautical Miles)

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: New York, N. Y., is 1399 nautical miles from San Juan, P. R.

	MONTREAL, CANADA* (St. Lambert Lock)	Cabot Strait 47°07.0'N., 60°17.0'W	Gut of Canso (Lock) 45°39.0'N., 61°25.0'W	Portland, Maine 43°39.4'N., 70°14.7'W	Boston, Mass 42°22.0'N., 71°03.0'W	NANTUCKET SHOALS 40°30.0'N., 69°25.0'W	NEW YORK, N Y 40°42.0'N., 74°01.0'W	Philadelphia, Pa 39°56.8'N., 75°08.3'W	Baltimore, Md 39°16.0'N., 76°34.5'W	CHESAPEAKE BAY ENT 36°56.3'N., 75°58.6'W	Norfolk, Va 36°50.9'N., 76°17.5'W	DIAMOND SHOALS 35°08.0'N., 75°15.0'W	Wilmington, N C 34°14.0'N., 77°57.0'W	Charleston, S C 32°47.2'N., 79°55.2'W	Savannah, Ga 32°05.0'N., 81°05.7'W	Jacksonville, Fla 30°19.2'N., 81°39.0'W	Key West, Fla 24°33.7'N., 81°48.5'W	STRAITS OF FLORIDA 24°25.0'N., 83°00.0'W	Tampa, Fla 27°56.5'N., 82°26.7'W	Pensacola, Fla 30°24.0'N., 87°13.0'W	Mobile, Ala 30°42.5'N., 88°02.5'W	NEW ORLEANS, La (via SW Pass) 29°57.0'N., 90°03.7'W	Port Arthur, Tex 29°49.5'N., 93°57.6'W	Galveston, Tex 29°19.0'N., 94°47.0'W	Corpus Christi, Tex 27°48.8'N., 97°24.0'W	San Juan, P. R. 18°27.8'N., 66°06.7'W	YUCATAN CHANNEL 21°50.0'N., 85°03.0'W	Panama Canal (Atlantic Ent) 9°23.5'N., 79°55.3'W	PANAMA CANAL (Pacific Ent) 8°53.0'N., 79°31.0'W
Cabot Strait 47°07.0'N., 60°17.0'W	681																												
Gut of Canso (Lock) 45°39.0'N., 61°25.0'W	717	120																											
Portland, Maine 43°39.4'N., 70°14.7'W	1276	595	484																										
Boston, Mass 42°22.0'N., 71°03.0'W	1318	637	526	100																									
NANTUCKET SHOALS 40°30.0'N., 69°25.0'W	1311	630	519	203	163																								
NEW YORK, N Y 40°42.0'N., 74°01.0'W	1534	853	742	426	386	223																							
Philadelphia, Pa 39°56.8'N., 75°08.3'W	1682	1001	890	575	535	372	240																						
Baltimore, Md 39°16.0'N., 76°34.5'W	1838	1157	1046	734	694	531	417	392																					
CHESAPEAKE BAY ENT 36°56.3'N., 75°58.6'W	1689	1008	896	584	544	381	267	242	150																				
Norfolk, Va 36°50.9'N., 76°17.5'W	1716	1035	923	611	571	408	294	269	173	27																			
DIAMOND SHOALS 35°08.0'N., 75°15.0'W	1729	1048	936	628	588	425	345	322	267	117	144																		
Wilmington, N C 34°14.0'N., 77°57.0'W	1948	1267	1155	847	807	644	564	541	486	336	363	219																	
Charleston, S C 32°47.2'N., 79°55.2'W	2014	1333	1221	913	873	710	630	607	552	402	429	285	151																
Savannah, Ga 32°05.0'N., 81°05.7'W	2088	1407	1295	987	947	784	704	681	626	476	503	359	227	102															
Jacksonville, Fla 30°19.2'N., 81°39.0'W	2172	1491	1379	1071	1031	868	788	765	710	560	587	443	315	197	145														
Key West, Fla 24°33.7'N., 81°48.5'W	2479	1798	1690	1387	1347	1184	1109	1086	1031	881	908	764	667	572	543	462													
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												
Tampa, Fla 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											
Pensacola, Fla 30°24.0'N., 87°13.0'W	2977	2296	2188	1885	1845	1682	1607	1584	1529	1379	1406	1262	1165	1070	1041	960	510	437	347										
Mobile, Ala 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									
NEW ORLEANS, La (via SW Pass) 29°57.0'N., 90°03.7'W	3080	2399	2291	1988	1948	1785	1710	1687	1632	1482	1509	1365	1268	1173	1144	1063	613	540	502	288	269								
Port Arthur, Tex 29°49.5'N., 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							
Galveston, Tex 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						
Corpus Christi, Tex 27°48.8'N., 97°24.0'W	3347	2666	2558	2255	2215	2052	1977	1954	1899	1749	1776	1632	1535	1440	1411	1330	880	807	810	618	605	555	249	207					
San Juan, P. R. 18°27.8'N., 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				
YUCATAN CHANNEL 21°50.0'N., 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			
Panama Canal (Atlantic Ent) 9°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		
PANAMA CANAL (Pacific Ent) 8°53.0'N., 79°31.0'W	3249	2568	2465	2235	2195	2032	2018	2001	1950	1800	1827	1683	1655	1609	1610	1559	1106	1047	1259	1386	1417	1442	1533	1539	1595	1036	855	46	

*Quebec, Canada - SUBTRACT 139 miles

All tabular distances are by outside routes which can be used by the deepest-draft vessel that the listed ports can accommodate. Lighter-draft vessels can save considerable mileage by transiting Canso Lock (Canada), the Cape Cod Canal (Massachusetts), and the Chesapeake and Delaware Canal (Delaware-Maryland); see the detailed tables. Gulf of Mexico distances are through the Shipping Safety Fairways.

COASTWISE DISTANCES
NEW YORK, N.Y., TO CHESAPEAKE BAY ENTRANCE, VA.
(Nautical Miles)

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: New York, N. Y., is 240 nautical miles from Philadelphia, Pa.

	NANTUCKET SHOALS 40°30.0'N., 69°25.0'W.	MONTAUK POINT, N.Y. 41°01.7'N., 71°47.3'W.	NEW YORK, N.Y. 40°42.0'N., 74°01.0'W.	Manasquan Inlet, N.J. 40°06.1'N., 74°01.9'W.	Barnegat Inlet, N.J. 39°46.0'N., 74°06.3'W.	Atlantic City, N.J. 39°22.6'N., 74°24.9'W.	Cape May Harbor, N.J. 38°57.1'N., 74°52.6'W.	DELAWARE BAY ENTRANCE 38°50.5'N., 75°03.3'W.	Harbor of Refuge, Del. 38°49.0'N., 75°05.2'W.	CHES. & DEL. CANAL E. ENT. 39°33.8'N., 75°32.8'W.	Wilmington, Del. 39°43.2'N., 75°31.5'W.	Marcus Hook, Pa. 39°48.2'N., 75°25.2'W.	Chester, Pa. 39°50.0'N., 75°22.0'W.	Philadelphia, Pa. 39°56.8'N., 75°08.3'W.	U.S. Steel Basin, Pa. 40°08.2'N., 74°45.3'W.	Trenton, N.J. 40°11.4'N., 74°45.4'W.	Indian River Inlet, Del. 38°36.5'N., 75°03.6'W.	Ocean City, Md. 38°19.6'N., 75°05.6'W.	Chincoteague, Va. 37°56.1'N., 75°22.8'W.	CHESAPEAKE BAY ENT. 36°56.3'N., 75°58.6'W.
113																				
223	122																			
212	117	40																		
221	131	63	22																	
242	159	94	52	32																
271	192	128	85	65	37															
285	212	153	97	78	49	16														
285	212	153	98	79	50	17	2													
336	263	204	148	129	100	67	51	52												
347	274	215	159	140	111	78	62	63	11											
353	280	221	165	146	117	84	68	69	17	8										
356	283	224	169	150	121	88	72	73	21	11	3									
372	299	240	184	165	136	103	87	88	36	26	18	15								
395	322	263	207	188	159	126	110	111	59	49	41	38	23							
400	327	268	212	193	164	131	115	116	64	54	46	43	28	5						
285	209	145	105	86	57	24	15	14	66	77	83	86	101	124	129					
295	227	161	121	101	73	40	32	31	83	95	101	104	119	142	147	20				
328	262	201	161	141	113	80	72	71	123	134	140	144	159	182	187	60	41			
381	322	267	219	199	171	141	155	155	206	218	224	227	242	265	270	118	100	69		

Ambrose Light (40°27.5'N., 73°49.9'W.) to New York, 20.7 miles.
Five Fathom Bank Lighted Horn Buoy F (38°47.3'N., 74°34.6'W.) to Philadelphia, 111 miles.
Delaware Lighted Horn Buoy D (38°27.3'N., 74°41.8'W.) to Philadelphia, 116 miles.
Chesapeake Light (36°54.3'N., 75°42.8'W.) to Norfolk, 42 miles; Baltimore, 165 miles.

DISTANCES BY INTRACOASTAL WATERWAY
MANASQUAN INLET, N.J., TO CAPE MAY CANAL, N.J.
(Nautical Miles)

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Atlantic City N.J., is 13 nautical miles from Ocean City, N.J.

	NEW YORK, N.Y. (The Battery)* 40°42' 0"N., 74°01' 0"W.	Shark River Inlet* 40°11' 2"N., 74°00' 5"W.	Manasquan Inlet* 40°06' 1"N., 74°01' 9"W.	Bay Head 40°03' 8"N., 74°03' 1"W	Mantoloking 40°02' 2"N., 74°03' 4"W	Toms River (town) 39°56' 9"N., 74°11' 8"W	Seaside Park 39°55' 3"N., 74°05' 0"W	Forked River (town) 39°50' 1"N., 74°11' 7"W	Barnegat Inlet 39°46' 0"N., 74°06' 3"W	Beach Haven 39°34' 0"N., 74°14' 8"W	Atlantic City 39°22' 6"N., 74°24' 9"W	Mays Landing 39°26' 9"N., 74°43' 4"W	Ocean City 39°17' 3"N., 74°34' 4"W	Sea Isle City 39°09' 4"N., 74°42' 0"W	Avalon 39°06' 6"N., 74°44' 0"W	Stone Harbor 39°03' 4"N., 74°46' 0"W	Wildwood 39°00' 5"N., 74°49' 8"W	Cape May Harbor 38°57' 1"N., 74°52' 6"W	Cape May Canal W. Ent 38°58' 0"N., 74°58' 0"W	CHES. & DEL. CANAL E. ENT. 39°33' 8"N., 75°32' 8"W
34																				
40	6																			
44	9	4																		
46	11	6	2																	
58	23	18	14	12																
54	20	14	10	9	7															
63	29	23	19	17	15	10														
66	32	26	22	20	18	13	8													
79	45	39	35	33	31	26	21	20												
97	62	57	53	51	49	44	39	38	18											
124	90	84	80	79	77	71	66	65	45	30										
108	74	68	64	63	60	55	50	49	29	13	18									
119	85	79	76	74	72	66	61	60	40	25	29	11								
123	89	83	79	77	75	70	65	64	44	28	33	15	4							
128	94	88	85	83	81	75	70	69	49	34	38	20	9	5						
133	99	93	89	88	86	80	75	74	54	39	43	25	14	10	5					
138	103	98	94	92	90	85	80	79	59	43	47	30	18	15	9	5				
142	108	102	98	96	94	89	84	83	63	47	52	34	23	19	14	9	4			
190	156	150	146	144	142	137	132	131	111	95	100	82	71	67	62	57	52	48		

* Outside distances between New York and Manesquan Inlet.

DISTANCES ON DELAWARE BAY AND RIVER

(Nautical Miles)

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Salem, N.J., is 41 nautical miles from Philadelphia, Pa.

	DELAWARE BAY ENT. 38°50.5'N., 75°03.3'W.	Roosevelt Inlet, Del. 38°47.7'N., 75°09.4'W.	Cape May Canal W. Ent., N.J. 38°58.0'N., 74°58.0'W.	St. Jones River Mouth, Del. 39°04.0'N., 75°22.5'W.	Mauricetown, N.J. 39°17.1'N., 74°59.5'W.	Bridgeton, N.J. 39°25.5'N., 75°14.2'W.	Smyrna River Mouth, Del. 39°22.2'N., 75°30.2'W.	Salem, N.J. 39°34.6'N., 75°28.7'W.	CHES. & DEL. CANAL E. ENT. 39°33.8'N., 75°32.6'W.	New Castle, Del. 39°39.4'N., 75°33.6'W.	Wilmington, Del. 39°43.2'N., 75°31.5'W.	Marcus Hook, Pa. 39°48.2'N., 75°25.2'W.	Bridgeport, N.J. 39°48.0'N., 75°21.3'W.	Chester, Pa. 39°50.0'N., 75°22.0'W.	Schuylkill River Mouth, Pa. 39°52.8'N., 75°11.9'W.	Philadelphia, Pa. 39°56.8'N., 75°08.3'W.	Burlington, N.J. 40°04.9'N., 74°51.8'W.	U.S. Steel Basin, Pa. 40°08.2'N., 74°45.3'W.	Bordentown, N.J. 40°09.1'N., 74°43.0'W.	Trenton, N.J. 40°11.4'N., 74°45.4'W.
6																				
9	14																			
20	20	21																		
33	37	26	30																	
51	52	47	35	51																
39	40	36	21	39	25															
54	55	51	36	54	39	16														
51	52	48	34	51	36	13	5													
58	59	55	40	58	43	20	12	7												
62	63	59	45	62	47	24	16	11	5											
68	69	65	51	68	53	30	22	17	12	8										
72	73	69	55	72	57	34	26	21	15	11	4									
72	73	69	55	72	57	34	26	21	15	11	3	6								
80	81	77	63	80	65	42	34	29	23	19	12	14	9							
87	88	84	69	87	72	49	41	36	30	26	18	22	15	7						
103	104	100	85	103	88	65	57	52	46	42	34	37	31	23	16					
110	111	107	92	110	95	72	64	59	53	49	41	44	38	29	23	7				
112	113	109	94	112	97	74	66	61	55	51	43	46	40	31	25	9	2			
115	116	112	97	115	100	77	69	64	58	54	46	49	43	34	28	12	5	4		

CHESAPEAKE BAY DISTANCES
(Nautical Miles)

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Washington, D.C., is 155 nautical miles from Annapolis, Md.

	CHES. & DEL. CANAL E. ENT. 39°33. 8'N., 75°32. 6'W.	Chesapeake City, Md 39°31. 6'N., 75°48. 9'W.	Havre de Grace, Md 39°32. 7'N., 76°05. 0'W.	Baltimore, Md 39°16. 0'N., 76°34. 5'W.	Chestertown, Md 39°12. 4'N., 76°03. 8'W.	Annapolis, Md 38°59. 0'N., 76°28. 6'W.	St. Michaels, Md 38°47. 2'N., 76°13. 2'W.	Cambridge, Md 38°34. 4'N., 76°04. 3'W.	Solomons, Md 38°19. 2'N., 76°27. 4'W.	Salisbury, Md 38°21. 9'N., 75°36. 3'W.	Potomac River Mouth 37°57. 7'N., 76°16. 7'W.	Washington, D.C. 38°52. 4'N., 77°01. 4'W.	Cristfield, Md 37°58. 6'N., 75°51. 9'W.	Fredericksburg, Va 38°17. 8'N., 77°27. 2'W.	Cape Charles, Va 37°15. 9'N., 76°01. 4'W.	Yorktown, Va 37°14. 4'N., 76°30. 5'W.	West Point, Va 37°31. 6'N., 76°48. 1'W.	Newport News, Va 36°58. 0'N., 76°26. 0'W.	Suffolk, Va 36°44. 3'N., 76°35. 0'W.	Hopewell, Va 37°19. 0'N., 77°16. 4'W.	Petersburg, Va 37°14. 1'N., 77°24. 0'W.	Richmond, Va 37°31. 4'N., 77°25. 2'W.	Norfolk, Va 36°50. 9'N., 76°17. 9'W.	CHESAPEAKE BAY ENT. 36°56. 3'N., 75°58. 6'W.
13																								
33	20																							
62	49	41																						
78	65	61	45																					
65	52	45	28	40																				
83	70	62	45	59	25																			
98	85	78	60	72	39	36																		
103	90	84	66	78	45	48	39																	
143	130	124	107	119	86	89	81	51																
122	109	101	84	96	64	65	58	27	49															
213	200	192	175	187	155	156	149	118	141	96														
134	121	115	98	110	77	80	72	42	43	27	121													
243	230	224	206	219	186	190	182	150	165	125	221	129												
169	156	149	132	146	112	116	107	76	87	50	146	51	122											
192	179	163	155	156	130	126	117	87	100	68	164	64	132	28										
214	201	185	174	178	152	149	140	109	122	90	186	86	154	50	22									
207	194	172	170	167	136	138	129	97	110	86	182	74	143	29	55	63								
209	196	190	172	185	152	156	147	115	128	89	185	92	161	48	55	78	21							
265	252	230	228	225	194	196	187	155	168	144	240	132	201	88	114	122	58	79						
259	246	240	222	235	204	206	197	165	178	137	233	142	211	97	101	123	68	89	10					
284	271	249	247	244	213	215	206	174	187	163	259	151	220	106	132	140	77	98	19	28				
209	196	175	173	170	140	141	132	100	113	89	185	77	146	32	58	66	12	29	70	80	90			
187	174	166	150	162	129	132	123	92	103	67	163	67	136	21	34	56	24	42	82	92	101	27		

DISTANCES ON POTOMAC RIVER

(Nautical Miles)

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: Colonial Beach, Va., is 63 nautical miles from Washington, D.C.

	Potomac River Mouth 37°57. 7'N., 76°16. 7'W.	Coan River Mouth, Va. 37°58. 7'N., 76°27. 1'W.	Smith Creek Mouth, Md. 38°05. 6'N., 76°24. 0'W.	St. Marys River Mouth, Md. 38°06. 2'N., 76°25. 3'W.	Yeocomico River Mouth, Va. 38°02. 1'N., 76°31. 0'W.	Piney Point, Md. 38°08. 0'N., 76°32. 0'W.	Lower Machodoc Creek, Va. 38°08. 5'N., 76°39. 1'W.	Nomini Bay, Va. 38°08. 6'N., 76°43. 4'W.	Breton Bay Entrance, Md. 38°14. 0'N., 76°41. 8'W.	Wicomico River mouth, Md. 38°14. 5'N., 76°49. 1'W.	Colonial Beach, Va. 38°14. 4'N., 76°57. 9'W.	Dahlgren, Va. 38°19. 1'N., 77°02. 1'W.	Potomac River (U.S. 301) Bridge 38°21. 7'N., 76°59. 4'W.	Quantico, Va. 38°31. 2'N., 76°17. 2'W.	Occoquan, Va. 38°41. 0'N., 77°15. 4'W.	Indian Head, Md. 38°36. 4'N., 77°10. 1'W.	Marshall Hall, Md. 38°41. 2'N., 77°06. 2'W.	Mount Vernon, Va. 38°42. 3'N., 77°05. 3'W.	Alexandria, Va. 38°48. 2'N., 77°02. 3'W.	Bladensburg, Md. 38°56. 1'N., 76°56. 4'W.	Washington, D.C. 38°52. 4'N., 77°01. 4'W.	Key Bridge 38°54. 1'N., 77°04. 2'W.	Chain Bridge 38°55. 7'N., 77°07. 0'W.
11																							
11	17																						
12	8	3																					
13	6	8	7																				
16	11	10	8	9																			
23	18	17	15	16	7																		
27	22	21	19	20	11	5																	
26	22	21	19	19	11	8	6																
31	26	25	23	24	15	10	8	9															
36	33	32	30	31	22	17	15	16	9														
43	37	36	34	35	27	21	19	20	12	10													
44	38	37	35	36	28	22	20	21	13	11	6												
66	63	62	60	61	52	47	45	46	38	35	30	24											
80	75	74	72	72	64	59	57	58	50	47	42	36	12										
76	70	69	69	68	60	55	52	54	45	43	38	32	8	7									
83	77	76	74	75	67	62	59	61	52	50	45	39	15	14	7								
84	79	78	76	76	68	63	60	62	53	51	46	40	16	15	8	2							
91	86	85	83	84	75	70	68	69	61	58	53	46	24	23	16	9	9						
101	96	95	93	94	85	80	78	79	71	68	63	56	34	33	26	19	19	10					
96	90	89	87	88	80	75	72	74	65	63	58	52	26	27	20	13	13	4	8				
98	93	92	90	91	82	77	75	76	68	65	60	55	30	30	23	16	16	7	11	5			
101	96	95	93	94	85	80	78	79	71	68	63	58	33	33	26	19	19	10	14	8	3		

Radio Bearing Conversion Table

Table of corrections, in minutes

[DIFFERENCE OF LONGITUDE IN DEGREES]

Mid. L.	½°	1°	1½°	2°	2½°	3°	3½°	4°	4½°	5°	5½°	6°	6½°	7°	7½°	8°	8½°	9°	9½°	10°
15°	4	8	12	16	19	23	27	31	35	40	43	47	50	54	58	62	66	70	74	78
16°	4	8	12	17	21	25	29	33	37	41	45	50	54	58	62	66	70	74	79	83
17°	4	9	13	18	22	26	31	35	39	44	48	53	57	61	66	70	75	79	83	88
18°	5	9	13	19	23	28	32	37	42	46	51	56	60	65	70	74	79	83	88	93
19°	5	10	15	20	24	29	34	39	44	49	54	59	63	68	73	78	83	88	93	98
20°	5	10	15	21	26	31	36	41	46	51	56	62	67	72	77	82	87	92	98	103
21°	5	11	16	21	27	32	38	43	48	54	59	64	70	75	81	86	91	97	102	108
22°	6	11	17	22	28	34	39	45	51	56	62	67	73	79	84	90	96	101	107	112
23°	6	12	18	23	29	35	41	47	53	59	64	70	76	82	88	94	100	105	111	117
24°	6	12	18	24	31	37	43	49	55	61	67	73	79	85	92	98	104	110	116	122
25°	6	13	19	25	32	38	44	51	57	63	70	76	82	89	95	101	108	114	120	127
26°	7	13	20	26	33	39	46	53	59	66	72	79	85	92	99	105	112	118	125	131
27°	7	14	20	27	34	41	48	54	61	68	75	82	89	95	102	109	116	123	129	136
28°	7	14	21	28	35	42	49	56	63	70	77	84	92	99	106	113	120	127	134	141
29°	7	15	21	29	36	44	51	58	65	73	80	87	95	102	109	116	124	131	138	145
30°	7	15	22	30	38	45	53	60	68	75	83	90	98	105	113	120	127	135	143	150
31°	8	15	23	31	39	46	54	62	70	77	85	93	100	108	116	124	131	139	146	155
32°	8	16	24	32	40	48	56	64	72	79	87	95	103	111	119	127	135	143	151	159
33°	8	16	25	33	41	49	57	65	74	82	90	98	106	114	123	131	139	147	155	163
34°	8	17	25	34	42	50	59	67	75	84	92	101	109	117	126	134	143	151	159	168
35°	9	17	26	34	43	52	60	69	77	86	95	103	112	120	129	138	146	155	163	172
36°	9	18	26	35	44	53	62	71	79	88	97	106	115	123	132	141	150	159	168	176
37°	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	163	172	181
38°	9	18	28	37	46	55	65	74	83	92	102	111	120	129	139	148	157	166	175	185
39°	9	19	28	38	47	57	66	75	85	94	104	113	123	132	142	151	160	170	179	189
40°	10	19	29	39	48	58	68	77	87	96	106	116	125	135	145	154	164	174	183	193
41°	10	20	30	39	49	59	69	79	89	98	108	118	128	138	148	157	167	177	187	197
42°	10	20	30	40	50	60	70	80	90	100	110	120	130	140	151	161	171	181	191	201
43°	10	20	31	41	51	61	72	82	92	102	113	123	133	143	153	164	174	184	194	205
44°	10	21	31	42	52	63	73	83	94	104	115	125	135	146	156	167	177	188	198	208
45°	11	21	32	42	53	64	74	85	95	106	117	127	138	149	159	170	180	191	201	212
46°	11	22	32	43	54	65	76	86	97	108	119	129	140	151	162	173	183	194	205	216
47°	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	186	197	208	219
48°	11	22	33	45	56	67	78	89	100	111	123	134	145	156	167	178	190	201	212	223
49°	11	23	34	45	57	68	79	91	102	113	125	136	147	158	170	181	192	204	215	226
50°	11	23	34	46	57	69	80	92	103	115	126	138	149	161	172	184	195	207	218	230
51°	12	23	35	47	58	70	82	93	105	117	128	140	152	163	175	186	198	210	221	233
52°	12	24	35	47	59	71	83	95	106	118	130	142	154	165	177	189	201	213	225	236
53°	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
54°	12	24	36	49	61	73	85	97	109	121	133	146	158	170	182	194	206	218	231	243
55°	12	25	37	49	61	74	86	98	111	123	135	147	160	172	184	197	209	221	233	246
56°	12	25	37	50	62	75	87	100	112	124	137	149	162	174	187	199	211	224	236	249
57°	13	25	38	50	63	75	88	101	113	126	138	151	164	176	189	201	214	226	239	252
58°	13	25	38	51	64	76	89	102	115	127	140	153	165	178	191	204	216	229	242	254
59°	13	26	39	51	64	77	90	103	116	129	141	154	167	180	193	206	219	231	244	257
60°	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260

Example. A ship in latitude 39°51′ N., longitude 67°35′ W., by dead reckoning, obtains a radio bearing of 299° true on the radiobeacon located in latitude 40°37′ N., longitude 69°37′ W.

Radiobeacon station	Latitude	40°37′ N.
Dead-reckoning position of ship	Latitude	39°51′
Middle latitude		40°14′
Radiobeacon station	Longitude	69°37′ W.
Dead-reckoning position of ship	Longitude	67°35′
Longitude difference		2°02′

Entering the table with difference of longitude equal 2°, which is the nearest tabulated value and opposite 40° middle latitude, the correction of 39′ is read.

As the ship is east of the radiobeacon, a minus correction is applied. The Mercator bearing then will be 299° − 000°39′ = 298°21′. To facilitate plotting, subtract 180° and plot from the position of the radiobeacon the bearing 298°21′ − 180°, or 118°21′ (Mercator bearing reckoned clockwise from true north).

Distance of Visibility of Objects at Sea

The following table gives the approximate geographic range of visibility for an object which may be seen by an observer whose eye is at sea level; in practice, therefore, it is necessary to add to these a distance of visibility corresponding to the height of the observer's eye above sea level.

Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles	Height, feet	Nautical miles
6	2.8	48	7.9	220	17.0	660	29.4	2,000	51.2
8	3.1	50	8.1	240	17.7	680	29.9	2,200	53.8
10	3.6	55	8.5	260	18.5	700	30.3	2,400	56.2
12	4.0	60	8.9	280	19.2	720	30.7	2,600	58.5
14	4.3	65	9.2	300	19.9	740	31.1	2,800	60.6
15	4.4	70	9.6	320	20.5	760	31.6	3,000	62.8
16	4.6	75	9.9	340	21.1	780	32.0	3,200	64.9
18	4.9	80	10.3	360	21.7	800	32.4	3,400	66.9
20	5.1	85	10.6	380	22.3	820	32.8	3,600	68.6
22	5.4	90	10.9	400	22.9	840	33.2	3,800	70.7
24	5.6	95	11.2	420	23.5	860	33.6	4,000	72.5
26	5.8	100	11.5	440	24.1	880	34.0	4,200	74.3
28	6.1	110	12.0	460	24.6	900	34.4	4,400	76.1
30	6.3	120	12.6	480	25.1	920	34.7	4,600	77.7
32	6.5	130	13.1	500	25.6	940	35.2	4,800	79.4
34	6.7	140	13.6	520	26.1	960	35.5	5,000	81.0
36	6.9	150	14.1	540	26.7	980	35.9	6,000	88.8
38	7.0	160	14.5	560	27.1	1,000	36.2	7,000	96.0
40	7.2	170	14.9	580	27.6	1,200	39.6	8,000	102.6
42	7.4	180	15.4	600	28.0	1,400	42.9	9,000	108.7
44	7.6	190	15.8	620	28.6	1,600	45.8	10,000	114.6
46	7.8	200	16.2	640	29.0	1,800	48.6		

Conversion Table, Degrees to Points and Vice Versa

° '	Points	° '	Points	° '	Points	° '	Points
000 00	N	090 00	E	180 00	S	270 00	W
002 49		092 49		182 49		272 49	
005 38	N ½ E	095 38	E ½ S	185 38	S ½ W	275 38	W ½ N
008 26		098 26		188 26		278 26	
011 15	N x E	101 15	E x S	191 15	S x W	281 15	W x N
014 04		104 04		194 04		284 04	
016 53	N x E ½ E	106 53	ESE ½ E	196 53	S x W ½ W	286 53	WNW ½ W
019 41		109 41		199 41		289 41	
022 30	NNE	112 30	ESE	202 30	SSW	292 30	WNW
025 19		115 19		205 19		295 19	
028 08	NNE ½ E	118 08	SE x E ½ E	208 08	SSW ½ W	298 08	NW x W ½ W
030 56		120 56		210 56		300 56	
033 45	NE x N	123 45	SE x E	213 45	SW x S	303 45	NW x W
036 34		126 34		216 34		306 34	
039 23	NE ½ N	129 23	SE ½ E	219 23	SW ½ S	309 23	NW ½ W
042 11		132 11		222 11		312 11	
045 00	NE	135 00	SE	225 00	SW	315 00	NW
047 49		137 49		227 49		317 49	
050 38	NE ½ E	140 38	SE ½ S	230 38	SW ½ W	320 38	NW ½ N
053 26		143 26		233 26		323 26	
056 15	NE x E	146 15	SE x S	236 15	SW x W	326 15	NW x N
059 04		149 04		239 04		329 04	
061 53	NE x E ½ E	151 53	SSE ½ E	241 53	SW x W ½ W	331 53	NNW ½ W
064 41		154 41		244 41		334 41	
067 30	ENE	157 30	SSE	247 30	WSW	337 30	NNW
070 19		160 19		250 19		340 19	
073 08	ENE ½ E	163 08	S x E ½ E	253 08	WSW ½ W	343 08	N x W ½ W
075 56		165 56		255 56		345 56	
078 45	E x N	168 45	S x E	258 45	W x S	348 45	N x W
081 34		171 34		261 34		351 34	
084 23	E ½ N	174 23	S ½ E	264 23	W ½ S	354 23	N ½ W
087 11		177 11		267 11		357 11	

Conversion Tables

INTERNATIONAL NAUTICAL MILES TO STATUTE MILES

1 nautical mile 6,076.12 feet or 1,852 meters 1 statute mile = 5,280 feet or 1,609.35 meters

Nautical miles	0	1	2	3	4	5	6	7	8	9
0	0.000	1.151	2.302	3.452	4.603	5.754	6.905	8.055	9.206	10.357
10	11.508	12.659	13.809	14.960	16.111	17.262	18.412	19.563	20.714	21.865
20	23.016	24.166	25.317	26.468	27.619	28.769	29.920	31.071	32.222	33.373
30	34.523	35.674	36.825	37.976	39.126	40.277	41.428	42.579	43.730	44.880
40	46.031	47.182	48.333	49.483	50.634	51.785	52.936	54.087	55.237	56.388
50	57.539	58.690	59.840	60.991	62.142	63.293	64.444	65.594	66.745	67.896
60	69.047	70.197	71.348	72.499	73.650	74.801	75.951	77.102	78.253	79.404
70	80.554	81.705	82.856	84.007	85.158	86.308	87.459	88.610	89.761	90.911
80	92.062	93.213	94.364	95.515	96.665	97.816	98.967	100.118	101.268	102.419
90	103.570	104.721	105.871	107.022	108.173	109.324	110.475	111.625	112.776	113.927

STATUTE MILES TO INTERNATONAL NAUTICAL MILES

Statute miles	0	1	2	3	4	5	6	7	8	9
0	0.000	0.869	1.738	2.607	3.476	4.345	5.214	6.083	6.952	7.821
10	8.690	9.559	10.428	11.297	12.166	13.035	13.904	14.773	15.642	16.511
20	17.380	18.249	19.118	19.986	20.855	21.724	22.593	23.462	24.331	25.200
30	26.069	26.938	27.807	28.676	29.545	30.414	31.283	32.152	33.021	33.890
40	34.759	35.628	36.497	37.366	38.235	39.104	39.973	40.842	41.711	42.580
50	43.449	44.318	45.187	46.056	46.925	47.794	48.663	49.532	50.401	51.270
60	52.139	53.008	53.877	54.746	55.615	56.484	57.353	58.222	59.091	59.959
70	60.828	61.697	62.566	63.435	64.304	65.173	66.042	66.911	67.780	68.649
80	69.518	70.387	71.256	72.125	72.994	73.863	74.732	75.601	76.470	77.339
90	78.208	79.077	79.946	80.815	81.684	82.553	83.422	84.291	85.160	86.029

FEET TO METERS

Feet	0	1	2	3	4	5	6	7	8	9
0	0.00	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
10	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79
20	6.10	6.40	6.71	7.01	7.32	7.62	7.92	8.23	8.53	8.84
30	9.14	9.45	9.75	10.06	10.36	10.67	10.97	11.28	11.58	11.89
40	12.19	12.50	12.80	13.11	13.41	13.72	14.02	14.33	14.63	14.93
50	15.24	15.54	15.85	16.15	16.46	16.76	17.07	17.37	17.68	17.98
60	18.29	18.59	18.90	19.20	19.51	19.81	20.12	20.42	20.73	21.03
70	21.34	21.64	21.95	22.25	22.55	22.86	23.16	23.47	23.77	24.08
80	24.38	24.69	24.99	25.30	25.60	25.91	26.21	26.52	26.82	27.13
90	27.43	27.74	28.04	28.35	28.65	28.96	29.26	29.57	29.87	30.17

METERS TO FEET

Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	3.28	6.56	9.84	13.12	16.40	19.68	22.97	26.25	29.53
10	32.81	36.09	39.37	42.65	45.93	49.21	52.49	55.77	59.06	62.34
20	65.62	68.90	72.18	75.46	78.74	82.02	85.30	88.58	91.86	95.14
30	98.42	101.71	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.80	141.08	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.88	177.16	180.45	183.73	187.01	190.29	193.57
60	196.85	200.13	203.41	206.69	209.97	213.25	216.54	219.82	223.10	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.19
80	262.47	265.75	269.03	272.31	275.59	278.87	282.15	285.43	288.71	291.99
90	295.28	298.56	301.84	305.12	308.40	311.68	314.96	318.24	321.52	324.80

TABLE FOR ESTIMATING TIME OF TRANSIT

Distance	Speed in knots																		
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	30
Nautical miles	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*	*Days-hours*
10	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	.....	.....	.....	.....	.....	.....
20	0-3	0-2	0-2	0-2	0-2	0-2	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1
30	0-4	0-3	0-3	0-3	0-3	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-1	0-1	0-1	0-1	0-1	0-1
40	0-5	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-2	0-1
50	0-6	0-6	0-5	0-5	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-3	0-2	0-2	0-2	0-2	0-2	0-2
60	0-8	0-7	0-6	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-3	0-3	0-2	0-2
70	0-9	0-8	0-7	0-6	0-6	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-4	0-3	0-3	0-3	0-3	0-3	0-2
80	0-10	0-9	0-8	0-7	0-7	0-6	0-6	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-4	0-3	0-3	0-3	0-3
90	0-11	0-10	0-9	0-8	0-8	0-7	0-6	0-6	0-6	0-5	0-5	0-5	0-5	0-4	0-4	0-4	0-4	0-4	0-3
100	0-13	0-11	0-10	0-9	0-8	0-8	0-7	0-7	0-6	0-6	0-6	0-5	0-5	0-5	0-5	0-4	0-4	0-4	0-3
200	1-1	0-22	0-20	0-18	0-17	0-15	0-14	0-13	0-13	0-12	0-11	0-11	0-10	0-10	0-9	0-9	0-8	0-8	0-7
300	1-14	1-9	1-6	1-3	1-1	0-23	0-21	0-20	0-19	0-18	0-17	0-16	0-15	0-14	0-14	0-13	0-13	0-12	0-10
400	2-2	1-20	1-16	1-12	1-9	1-7	1-5	1-3	1-1	1-0	0-22	0-21	0-20	0-19	0-18	0-17	0-17	0-16	0-13
500	2-15	2-8	2-2	1-21	1-18	1-14	1-12	1-9	1-7	1-5	1-4	1-2	1-1	1-0	0-23	0-22	0-21	0-20	0-17
600	3-3	2-19	2-12	2-7	2-2	1-22	1-19	1-16	1-14	1-11	1-9	1-8	1-6	1-5	1-3	1-2	1-1	1-0	0-20
700	3-16	3-6	2-22	2-16	2-10	2-6	2-2	1-23	1-20	1-17	1-15	1-13	1-11	1-9	1-8	1-6	1-5	1-4	0-23
800	4-4	3-17	3-8	3-1	2-19	2-14	2-9	2-5	2-2	1-23	1-20	1-18	1-16	1-14	1-12	1-11	1-9	1-8	1-3
900	4-17	4-4	3-18	3-10	3-3	2-21	2-16	2-12	2-8	2-5	2-2	1-23	1-21	1-19	1-17	1-15	1-14	1-12	1-6
1,000	5-5	4-15	4-4	3-19	3-11	3-5	2-23	2-19	2-15	2-11	2-8	2-5	2-2	2-0	1-21	1-19	1-18	1-16	1-9
2,000	10-10	9-6	8-8	7-14	6-23	6-10	5-23	5-13	5-5	4-22	4-15	4-9	4-4	3-23	3-19	3-15	3-11	3-8	2-19
3,000	15-15	13-21	12-12	11-9	10-10	9-15	8-22	8-8	7-20	7-8	6-23	6-14	6-6	5-23	5-16	5-10	5-5	5-0	4-4
4,000	20-20	18-12	16-16	15-4	13-21	12-20	11-22	11-8	10-10	9-19	9-6	8-19	8-8	7-22	7-14	7-6	6-23	6-16	5-13
5,000	26-1	23-4	20-20	18-23	17-9	16-1	14-21	13-21	13-1	12-6	11-14	10-23	10-10	9-22	9-11	9-1	8-16	8-8	6-23
6,000	31-6	27-19	25-0	22-17	20-20	19-6	17-21	16-16	15-15	14-17	13-21	13-4	12-12	11-22	11-9	10-21	10-10	10-0	8-8

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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